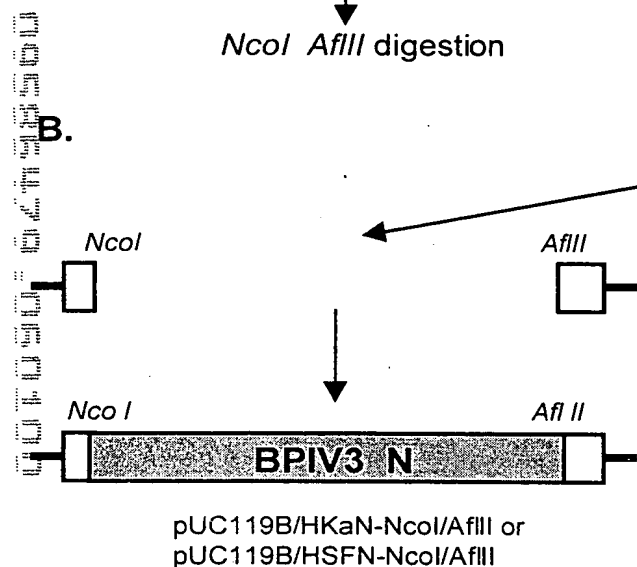
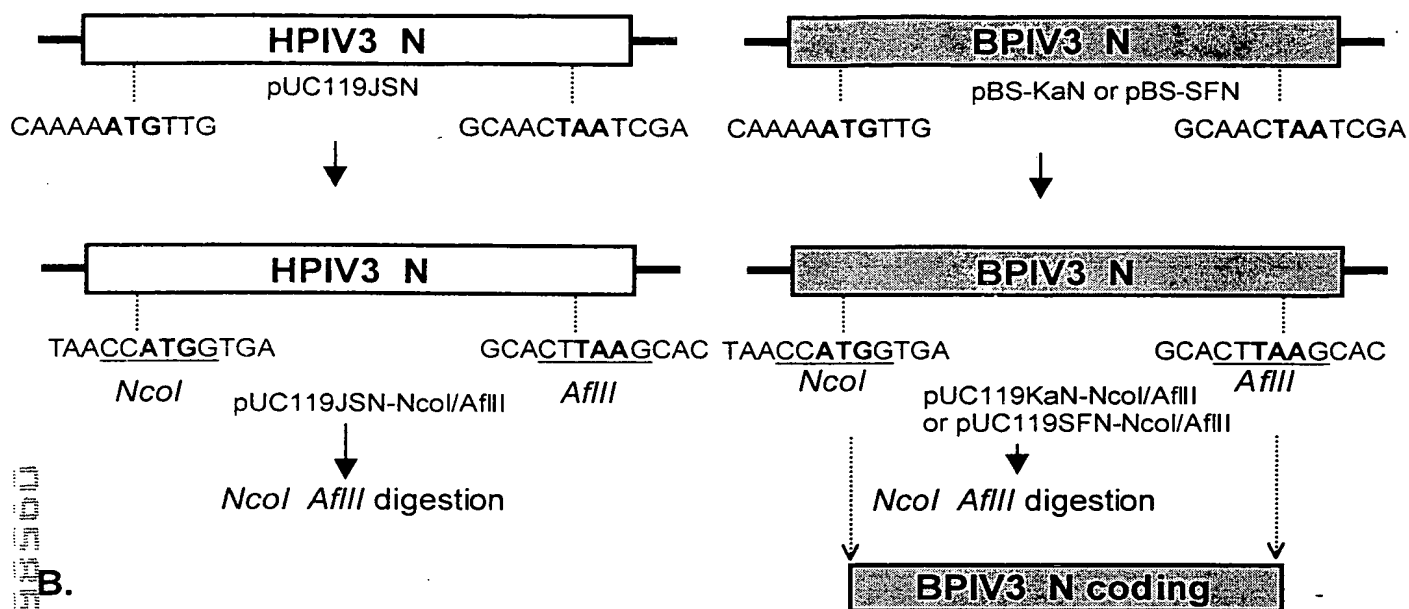
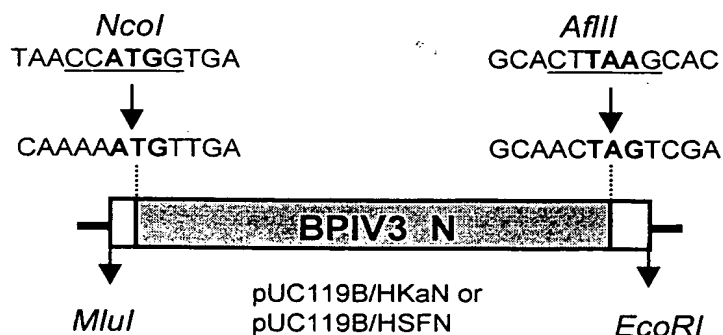


Figure 1. Cloning of BPIV3 strain Ka or strain SFN coding region into HPIV3 context

A. Mutagenesis to create restriction sites at start and stop codons of N



C. Mutagenesis to restore start and stop codon context



Legend

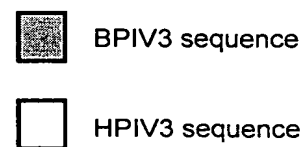


Figure 2. Cloning of BPIV3 N coding region into HPIV3 antigenomic cDNA

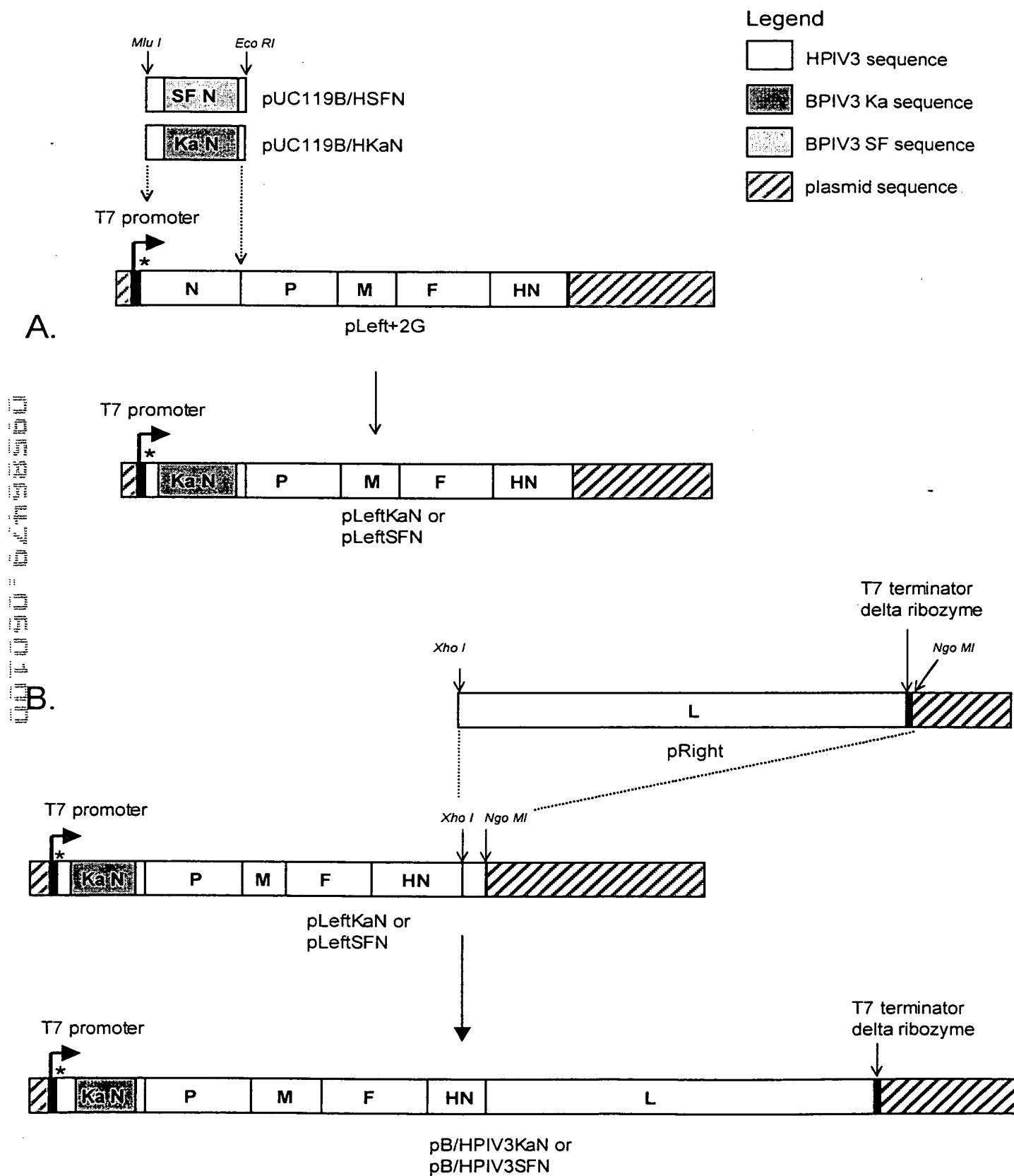


Figure 3. Nucleotide sequences of HPIV3, BPIV3 and chimeric viruses around the start (A) and stop (B) codons of the N gene

A.

rJS	GGAAC CTCTA <u>TAAT</u> TTCAAAAATGTTGAGCCTATTGATAC
cka	GGAAC CTCTA <u>TAAT</u> TTCAAAAAATGTTGAGTCTATTCGACAC
CSF	GGAAC CTCTA <u>TAAT</u> TTCAAAAAATGTTGAGTCTATTCGACAC
Ka	GAAATCCTAAGACTGTAATCATGTTGAGTCTATTCGACAC
SF	GAAATCCTAAGACTGTAATCATGTTGAGTCTATTCGACAC

B.

rJS	TTAACGCATTTGGAAGCACTAATCGAATCAACATTTTAA
cka	TCAGTGCATTCGGAAGCAACTAGTCGAATCAACATTTTAA
CSF	TCAGTGCATTCGGAAGCAACTAGTCGAATCAACATTTTAA
Ka	TCAGTGCATTCGGAAGCAACTAGTCACAAAGAGATGACCA
SF	TCAGTGCATTCGGAAGCAACTAGTCACAAAGAGATGACCA

Figure 4. Confirmation of identity of potential BPIV3/HP chimeras by TaqI digestion

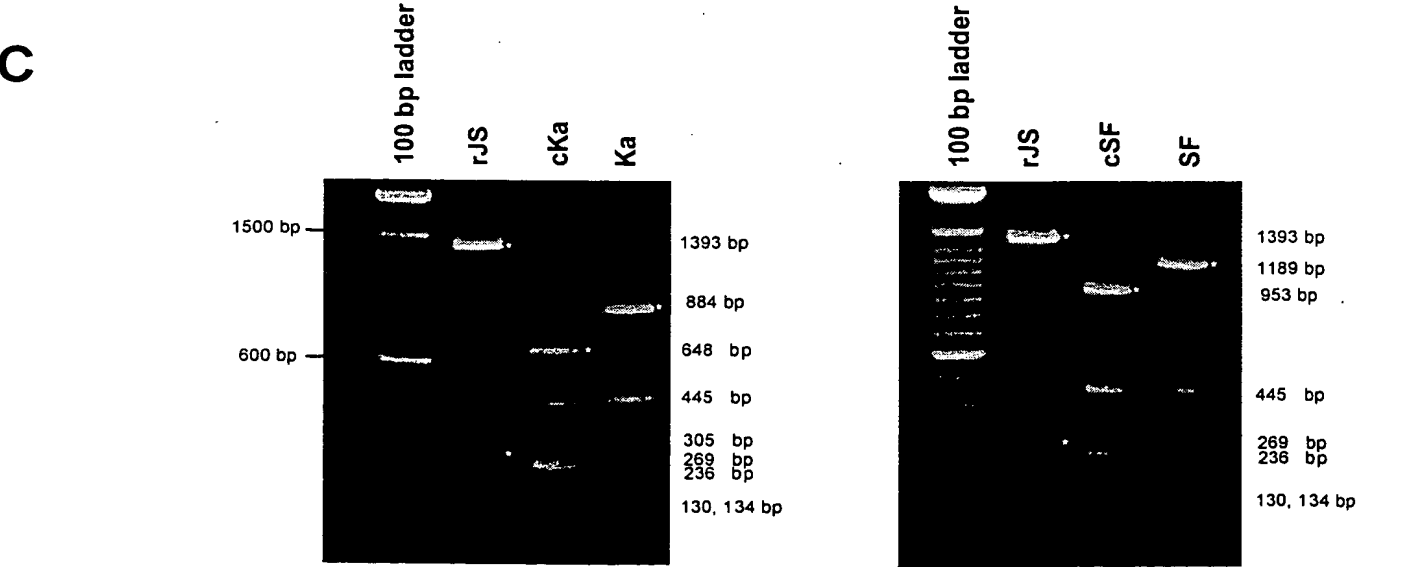
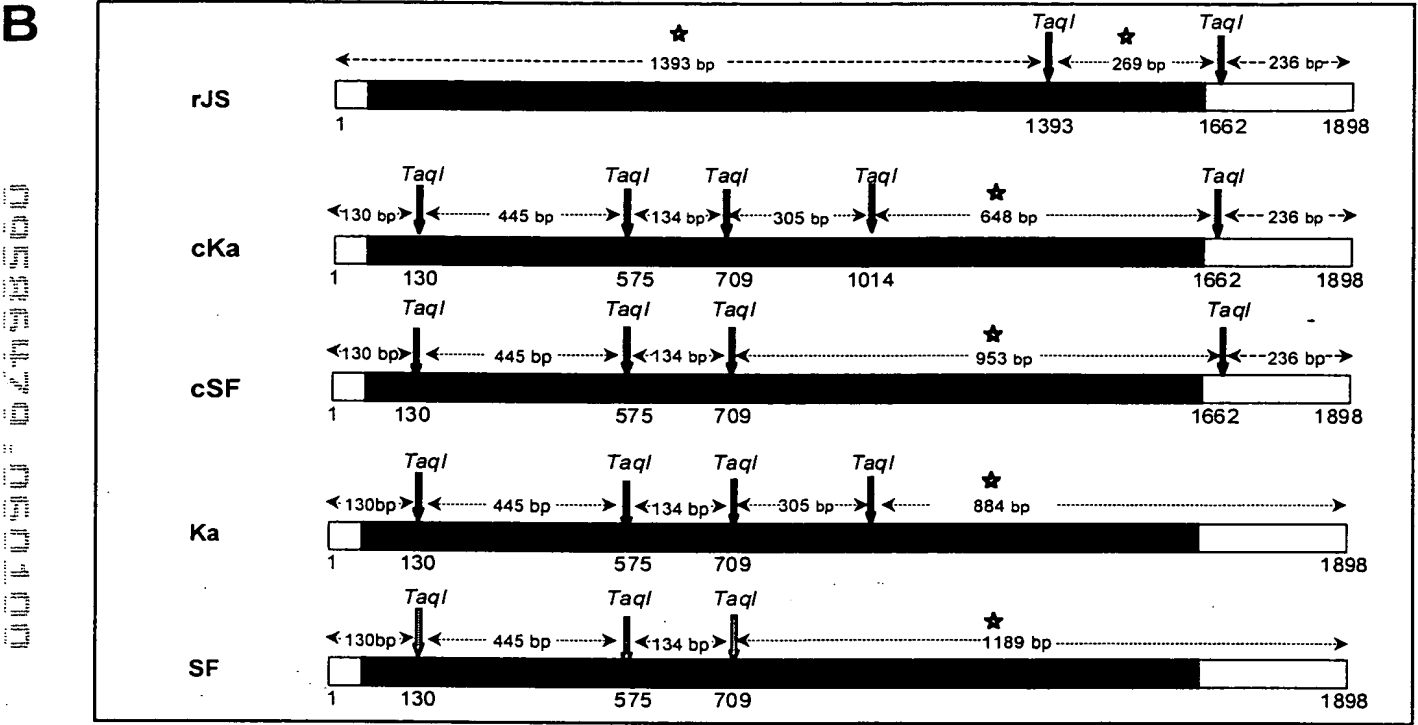
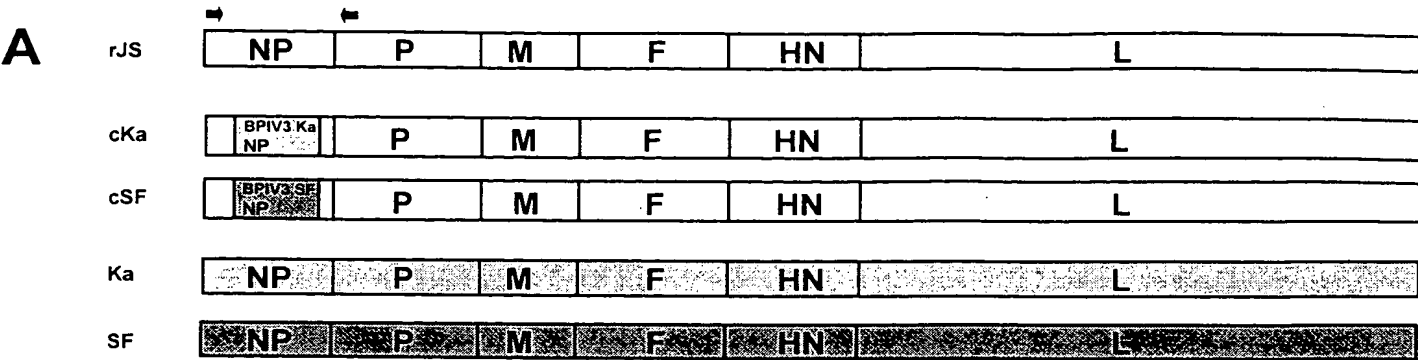
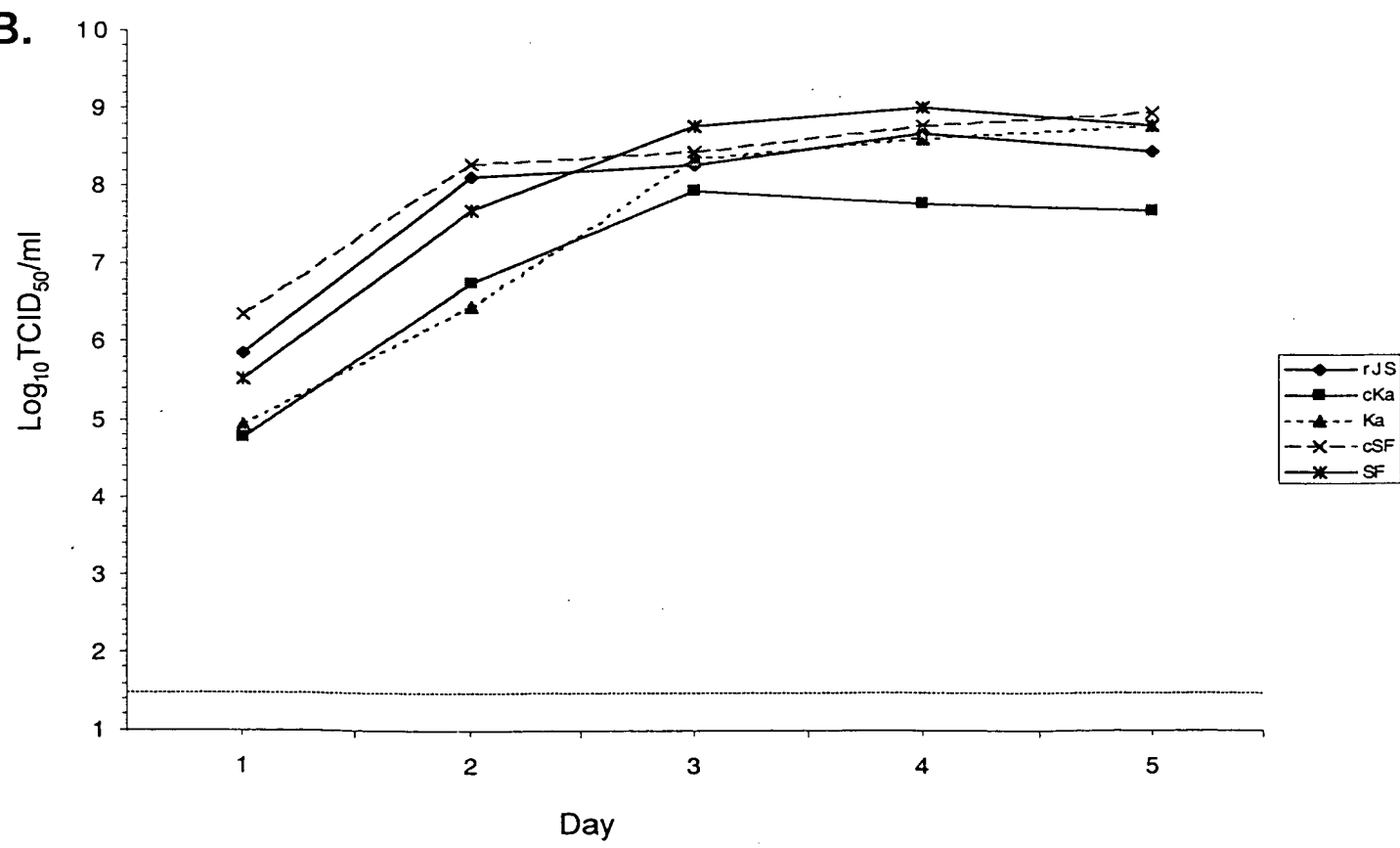
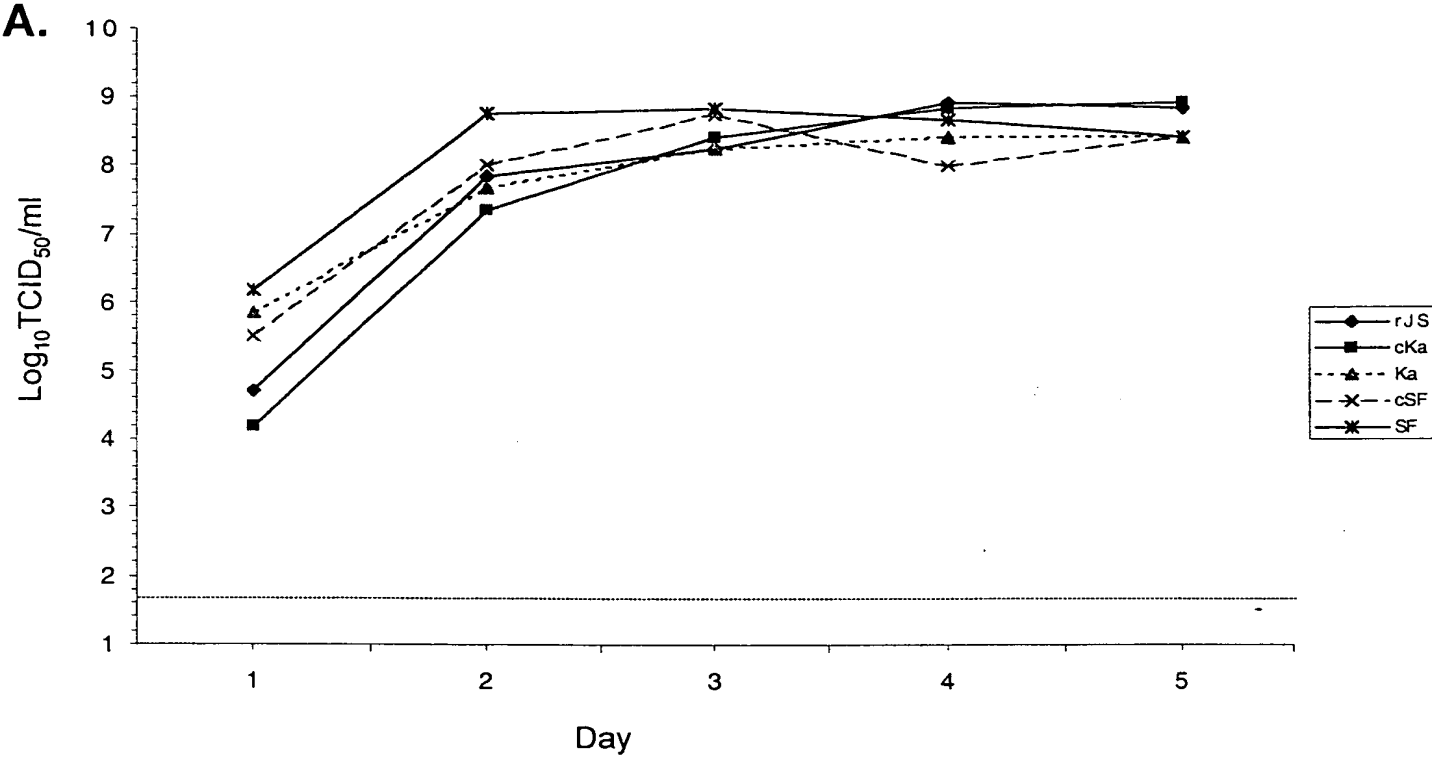


Figure 5. Multicycle growth curves in MDBK (A) or LLC-MK2 (B) cells



ACCAAACAAG	AGAAAGAGACT	TGCTTGGGAA	TATTAATTCA	AATAAAAATT	50
AACCTTAGAT	TAAAGAACTT	TACCGAAAGG	TAAGGGGAAA	GAAATCCTAA	100
GACTGTAATC	ATGTTGAGTC	TATTCGACAC	ATTCAGTGCG	CGTAGGCAGG	150
AGAACATAAC	GAAATCAGCT	GGTGGGGCTG	TTATTCCCGG	GCAAAAAAAC	200
ACTGTGTCTA	TATTTGCTCT	TGGACCATCA	ATAACAGATG	ACAATGATAA	250
AATGACATTG	GCTCTTCTCT	TTTTGTCTCA	TTCTTTAGAC	AATGAAAAGC	300
AGCATGCGCA	AAGAGCTGGA	TTTTTAGTTT	CTCTGTTATC	AATGGCTTAT	350
GCCAACCCAG	AATTATATTT	AACATCAAAT	GGTAGTAATG	CAGATGTTAA	400
ATATGTTATC	TACATGATAG	AGAAAGACCC	AGGAAGACAG	AAATATGGTG	450
GGTTTGTCTG	CAAGACTAGA	GAGATGGTTT	ATGAAAAGAC	AACTGATTGG	500
ATGTTTCGGG	GTGATCTTGA	GTATGATCAA	GACAATATGT	TGCAAAATGG	550
TAGAAGCACT	TCTACAATCG	AGGATCTTGT	TCATACTTTT	GGATATCCAT	600
CGTGTCTTGG	AGCCCTTATA	ATCCAAGTTT	GGATAATACT	TGTTAAGGCT	650
ATAACCAGTA	TATCAGGATT	GAGGAAAGGA	TTCTTTACTC	GGTTAGAAGC	700
ATTTCGACAA	GATGGAACAG	TTAAATCCAG	TCTAGTGTTG	AGCGGTGATG	750
CAGTAGAACA	AATTGGATCA	ATTATGAGGT	CCCAACAGAG	CTTGGTAACA	800
CTCATGGTTG	AAACACTGAT	AACAATGAAC	ACAGGCAGGA	ATGATCTGAC	850
AACAATAGAA	AAGAATATAC	AGATTGTAGG	AAACTACATC	AGAGATGCAG	900
GTCTTGCTTC	ATTTTTCAAC	ACAATCAGAT	ATGGCATTGA	GACTAGAATG	950
GCAGCTCTAA	CTCTGTCTAC	CCTTAGACCG	GATATCAACA	GACTCAAGGC	1000
ACTGATCGAG	TTATATCTAT	CAAAGGGGCC	ACGTGCTCCT	TTTATATGCA	1050
TTTTGAGAGA	TCCCGTGCAT	GGTGAGTTTG	CACCAGGCAA	CTATCCTGCC	1100
CTCTGGAGTT	ATGCGATGGG	TGTAGCAGTT	GTACAAAACA	AGGCCATGCA	1150
ACAGTATGTA	ACAGGAAGGT	CTTATCTGGA	TATTGAAATG	TTCCAAC TTG	1200
GTCAAGCAGT	GGCACGTGAT	GCCGAGTCGC	AGATGAGTTC	AATATTAGAG	1250
GATGAACTGG	GGGTCACACA	AGAAGCCAAG	CAAAGCTTGA	AGAAACACAT	1300
GAAGAACATC	AGCAGTTCAG	ATACAACCTT	TCATAAGCCT	ACAGGGGGAT	1350
CAGCCATAGA	AATGGCGATA	GATGAAGAAG	CAGGGCAGCC	TGAATCCAGA	1400
GGAGATCAGG	ATCAAGGAGA	TGAGCCTCGG	TCATCCATAG	TTCTTTATGC	1450
ATGGGCAGAC	GAAACCGGGA	ATGACAATCA	AACTGAATCA	ACTACAGAAA	1500
TTGACAGCAT	CAAAACTGAA	CAAAGAAACA	TCAGAGACAG	GCTGAACAAA	1550
AGACTCAACG	AGAAAAGGAA	ACAGAGTGAC	CCGAGATCAA	CTGACATCAC	1600
AAACAACACA	AATCAAAC TG	AAATAGATGA	TTTGTTCA GT	GCATTTCGGAA	1650
GCAACTAGTC	ACAAAGAGAT	GACCACTATC	ACCAGCAACA	AGTAAGAAAA	1700
ACTTAGGATT	AATGGAAATT	ATCCAATCCA	GAGACGGAAG	GACAAATCCA	1750
GAATCCAACC	ACAAC TCAAT	CAACCAAGA	TTCATGGAAG	ACAATGTTCA	1800
AAACAATCAA	ATCATGGATT	CTTGGGAAGA	GGGATCAGGA	GATAAATCAT	1850
CTGACATCTC	ATCGGCCCTC	GACATCATTG	AATTCATACT	CAGCACCGAC	1900
TCCCAAGAGA	ACACGGCAGA	CAGCAATGAA	ATCAACACAG	GAACCACAAG	1950
ACTTAGCACG	ACAATCTACC	AACCTGAATC	CAAAACAACA	GAAACAAGCA	2000
AGGAAAATAG	TGGACCAGCT	AACAAAAATC	GACAGTTTGG	GGCATCACAC	2050
GAACGTGCCA	CAGAGACAAA	AGATAGAAAT	GTTAATCAGG	AGACTGTACA	2100
GGGAGGATAT	AGGAGAGGAA	GCAGCCCAGA	TAGTAGAACT	GAGACTATGG	2150
TCACTCGAAG	AATCTCCAGA	AGCAGCCCAG	ATCCTAACAA	TGGAACCCAA	2200
ATCCAGGAAG	ATATTGATTA	CAATGAAGTT	GGAGAGATGG	ATAAGGACTC	2250
TACTAAGAGG	GAAATGCGAC	AATTTAAAGA	TGTTCCAGTC	AAGGTATCAG	2300
GAAGTGATGC	CATTCCTCCA	ACAAAACAAG	ATGGAGACGG	TGATGATGGA	2350

GTAGATGCAG	TTCTCCAGCC	TTCATTACCT	GGCGAATTCA	GATACTACCC	4750
AAACATCATA	GCAAAGGGG	TCGGGAAAT	CAGACAGTAA	AATCAACAAC	4800
CCTGATATCC	AACATTGCAA	ATCAGGCTAC	CCACAGGAGA	AAAATCAAAA	4850
ACTTAGGATC	AAAGGGATCA	CCACGAACCC	CGGAAAACAG	CCAAACAAAC	4900
CAACACACAA	ATCACAGACA	AAAAGGAGAA	GGCACTGCAA	AGACCGAGAA	4950
AAAACAGAAC	GCACACAACC	AAGCAGAGAA	AAGCCAAAGC	CCGCCATTCA	5000
CAAACACACC	AACAATCCTG	CAAACAAGCA	CCAAAACAGA	GGTCAAAAGA	5050
CAAAGAGCAC	CAGATATGAC	CATCACAACC	ACAATCATAG	CCATATTACT	5100
AATACCCCCA	TCATTTTGTG	AAATAGACAT	AACAAAACCTG	CAACGTGTAG	5150
GTGTGTTAGT	CAACAATCCT	AAAGGCATGA	AGATTTTCACA	AAATTTTCGAA	5200
ACGAGATACC	TGATATTAAG	TTTGATACCC	AAAATAGAGA	ATTCACACTC	5250
ATGTGGGGAT	CAACAGATAA	ACCAATACAA	GAAGTTATTG	GATAGATTGA	5300
TAATTCCTCT	ATATGATGGA	TTAAAATTAC	AAAAAGATGT	AATAGTAGTA	5350
AGTCATGAAA	CCCACAACAA	TACTAATCTT	AGGACAAAAC	GATTCTTTGG	5400
AGAGATAATT	GGGACAATTG	CGATAGGGAT	AGCCACTTCA	GCACAAATCA	5450
CCGCAGCAGT	CGCTCTTGTC	GAAGCTAAAC	AGGCAAAGTC	AGACATAGAA	5500
AAACTCAAAG	AGGCTATAAG	AGACACAAAC	AAGGCAGTAC	AATCGATTCA	5550
AAGTTCTGTA	GGTAACCTAA	TTGTTGCAGT	TAAATCAGTT	CAAGACTATG	5600
TCAACAATGA	AATTATACCT	TCAATCACAA	GATTAGGCTG	TGAAGCAGCA	5650
GGGTTACAAT	TGGGAATTGC	ATTGACACAA	CATTACTCAG	AATTAACAAA	5700
TATATTTGGT	GATAATATAG	GAACACTGAA	AGAAAAAGGG	ATAAAATTAC	5750
AAGGGATAGC	ATCATTATAT	CACACAAACA	TAACGGAAAT	ATTTACTACT	5800
TCAACAGTTG	ACCAATATGA	TATTTATGAC	CTATTATTCA	CTGAGTCAAT	5850
CAAGATGAGA	GTGATAGATG	TTGATTTGAG	TGATTACTCA	ATTACTCTTC	5900
AAGTTAGACT	TCCTTTATTA	ACTAAACTAT	CAAATACTCA	AATTTATAAA	5950
GTAGATTCTA	TATCATACAA	CATCCAGGGC	AAAGAGTGGT	ATATTCCTCT	6000
TCCCAATCAC	ATCATGACAA	AAGGGGCTTT	TCTAGGTGGT	GCTGATATTA	6050
AAGAATGCAT	AGAGGCATTC	AGCAGTTATA	TATGTCCTTC	TGATCCAGGT	6100
TACATATTAA	ATCACGAGAT	AGAGAATTGT	TTATCAGGGA	ACATAACACA	6150
GTGTCCTAAG	ACTGTTGTTA	CATCAGATGT	GGTACCACGA	TACGCGTTTG	6200
TGAATGGTGG	ATTAATTGCA	AACTGCATAA	CAACTACATG	TACATGCAAT	6250
GGAATTGACA	ATAGAATTAA	TCAATCACCT	GATCAAGGAA	TTAAGATCAT	6300
AACACATAAA	GAATGCCAGG	TAATAGGTAT	AAACGGAATG	TTATTCAATA	6350
CTAATAGAGA	AGGGACATTA	GCAACTTATA	CATTTGATGA	CATCATATTA	6400
AATAACTCTG	TTGCACTTAA	TCCAATTGAT	ATATCTATGG	AACTCAACAA	6450
GGCAAAACTA	GAATTAGAAG	AATCGAAGGA	ATGGATAAAG	AAATCAAATC	6500
AAAAGTTAGA	TTCCGTTGGA	AGTTGGTATC	AATCTAGTGC	AACAATCACC	6550
ATAATCATAG	TGATGATAAT	AATTCTAGTT	ATAATCAATA	TAACAATTAT	6600
TGTAGTCATA	ATCAAATTCC	ATAGAATTCA	GGGGAAAGAT	CAAAACGACA	6650
AAAACAGTGA	GCCGTATATA	CTGACAAATA	GACAATAAGA	CTATACACGA	6700
TCAAATATAA	AAAGTACAAA	AAACTTAGGA	ACAAAGTTGT	TCAACACAGC	6750
AGCACCGAAT	AGACCAAAAG	GCAGCGCAGA	GGCGACACCA	AACTCAAAAA	6800
TGGAATATTG	GAAACACACA	AACAGCATAA	ATAACACCAA	CAATGAAACC	6850
GAAACAGCCA	GAGGCAAACA	TAGTAGCAAG	GTTACAAATA	TCATAATGTA	6900
CACCTTCTGG	ACAATAACAT	TAACAATATT	ATCAGTCATT	TTTATAATGA	6950
TATTGACAAA	CTTAATTCAA	GAGAACAATC	ATAATAAATT	AATGTTGCAG	7000
GAAATAAGAA	AAGAATTCGC	GGCAATAGAC	ACCAAGATTC	AGAGGACTTC	7050

FIG. 6C

GGATGACATT	GGAACCTCAA	TACAGTCAGG	AATAAATACA	AGACTTCTCA	7100
CAATTCAGAG	TCATGTTCAA	AACTATATCC	CACTATCATT	AACACAACAA	7150
ATGTCAGATC	TCAGAAAATT	TATCAATGAT	CTAACAAATA	AAAGAGAACA	7200
TCAAGAAGTG	CCAATACAGA	GAATGACTCA	TGATAGAGGT	ATAGAACCCC	7250
TAAATCCAAA	CAAGTTCTGG	AGGTGTACAT	CTGGTAACCC	ATCTCTAACA	7300
AGTAGTCCTA	AGATAAGGTT	AATACCAGGA	CCAGGTTTAT	TAGCAACATC	7350
TACTACAGTA	AATGGCTGTA	TTAGAATTCC	ATCGTTAGTA	ATCAATCATC	7400
TAATCTATGC	TTACACCTCT	AATCTTATTA	CCCAGGGCTG	TCAAGATATA	7450
GGGAAATCTT	ACCAAGTACT	ACAAATAGGG	ATAATTACTA	TAAATTCGGA	7500
CCTAGTACCT	GATTTAAACC	CCAGAGTCAC	ACATACATTT	AATATTGATG	7550
ATAATAGAAG	ATCTTGCTCT	CTGGCACTAT	TGAATACAGA	TGTTTATCAG	7600
TTATGCTCAA	CACCAAAAGT	TGATGAAAGA	TCCGATTATG	CATCAACAGG	7650
TATTGAGGAT	ATTGTACTTG	ACATTGTCAC	TAATAATGGA	TTAATTATAA	7700
CAACAAGGTT	TACAAATAAT	AATATAACTT	TTGATAAACC	GTATGCAGCA	7750
TTGTATCCAT	CAGTGGGACC	AGGAATCTAT	TATAAGGATA	AAGTTATATT	7800
TCTCGGATAT	GGAGGTCTAG	AGCATGAAGA	AAACGGAGAC	GTAATATGTA	7850
ATACAACCTGG	TTGTCCTGGC	AAAACACAGA	GAGACTGTAA	TCAGGCTTCT	7900
TATAGCCCAT	GGTTCTCAA	TAGGAGAATG	GTAAACTCTA	TTATTGTTGT	7950
TGATAAAGGC	ATAGATGCAA	CTTTTAGCTT	GAGGGTGTGG	ACTATTCCAA	8000
TGAGCCAAAA	TTATTGGGGA	TCAGAAGGAA	GATTACTTTT	ATTAGGTGAC	8050
AGAATATACA	TATATACTAG	ATCCACAAGT	TGGCACAGTA	AATTACAGTT	8100
AGGGGTAATT	GATATTTCTG	ATTATACTAA	TATAAGAATA	AATTGGACTT	8150
GGCATAATGT	ACTATCACGG	CCAGGGAATG	ATGAATGTCC	ATGGGGTCAT	8200
TCATGCCCAG	ACGGATGTAT	AACAGGAGTT	TACACTGATG	CATATCCGCT	8250
AAACCCATCG	GGGAGTGTTG	TATCATCAGT	AATTCTTGAT	TCACAAAAGT	8300
CTAGAGAAAA	CCCAATCATT	ACTTACTCAA	CAGCTACAAA	TAGAATAAAT	8350
GAATTAGCTA	TATATAACAG	AACACTTCCA	GCTGCATATA	CAACAACAAA	8400
TTGTATCACA	CATTATGATA	AAGGGTATTG	TTTTTCATATA	GTAGAAATAA	8450
ATCACAGAAG	TTTGAATACG	TTTCAACCTA	TGTTATTCAA	AACAGAAGTT	8500
CCAAAAAACT	GCAGCTAAAT	TGATCATCGC	ATATCGGATG	CAAGATGACA	8550
TTAAAAGAGA	CCACCAGACA	GACAACACAG	GAGACGATGC	AAGATATAAA	8600
GAAATAATAA	AAAACCTTAGG	AGAAAAGTGT	GCAAGAAAAA	TGGACACCGA	8650
GTCCCACAGC	GGCACAACAT	CTGACATTCT	GTACCCTGAA	TGTCACCTCA	8700
ATTCTCCTAT	AGTTAAAGGA	AAGATAGCAC	AACTGCATAC	AATAATGAGT	8750
TTGCCTCAGC	CCTACGATAT	GGATGATGAT	TCAATACTGA	TTATTACTAG	8800
ACAAAAAATT	AAACTCAATA	AATTAGATAA	AAGACAACGG	TCAATTAGGA	8850
AATTAAGATC	AGTCTTAATG	GAAAGAGTAA	GTGATCTAGG	TAAATATACC	8900
TTTATCAGAT	ATCCAGAGAT	GTCTAGTGAA	ATGTTCCAAT	TATGTATACC	8950
CGGAATTAAT	AATAAAATAA	ATGAATTGCT	AAGTAAAGCA	AGTAAAACAT	9000
ATAATCAAAT	GACTGATGGA	TTAAGAGATC	TATGGGTTAC	TATACTATCG	9050
AAGTTAGCAT	CGAAAAATGA	TGGAAGTAAT	TATGATATCA	ATGAAGATAT	9100
TAGCAATATA	TCAAATGTTC	ACATGACTTA	TCAATCAGAC	AAATGGTATA	9150
ATCCATTCAA	GACATGGTTT	ACTATTAAGT	ATGACATGAG	AAGATTACAA	9200
AAAGCCAAAA	ATGAGATTAC	ATTCAATAGG	CATAAAGATT	ATAATCTATT	9250
AGAAGACCAA	AAGAATATAT	TGCTGATACA	TCCAGAACTC	GTCTTAATAT	9300
TAGATAAACA	AAATTACAAT	GGGTATATAA	TGACTCCTGA	ATTGGTACTA	9350
ATGTATTGTG	ATGTAGTTGA	AGGGAGGTGG	AATATAAGTT	CATGTGCAAA	9400

FIG. 6D

ATTGGATCCT	AAGTTACAAT	CAATGTATTA	TAAGGGTAAC	AATTTATGGG	9450
AAATAATAGA	TGGACTATTC	TCGACCTTAG	GAGAAAGAAC	ATTTGACATA	9500
ATATCACTAT	TAGAACCCT	TGCATTATCG	CTCATTCAAA	CTTATGACCC	9550
GGTTAAACAG	CTCAGGGGGG	CTTTTTTAAA	TCACGTGTTA	TCAGAAATGG	9600
AATTAATATT	TGCAGCTGAG	TGTACAACAG	AGGAAATACC	TAATGTGGAT	9650
TATATAGATA	AAATTTTAGA	TGTGTTCAAA	GAATCAACAA	TAGATGAAAT	9700
AGCAGAAATT	TTCTCTTTCT	TCCGAACTTT	TGGACACCCT	CCATTAGAGG	9750
CGAGTATAGC	AGCAGAGAAA	GTTAGAAAAGT	ATATGTATAC	TGAGAAATGC	9800
TTGAAATTTG	ATACTATCAA	TAAATGTTCAT	GCTATTTTTT	GTACAATAAT	9850
TATAAATGGA	TATAGAGAAA	GACATGGTGG	TCAATGGCCT	CCAGTTACAT	9900
TACCTGTCCA	TGCACATGAA	TTTATCATAA	ATGCATACGG	ATCAAATTCT	9950
GCCATATCAT	ATGAGAATGC	TGTAGATTAT	TATAAGAGCT	TCATAGGAAT	10000
AAAATTTGAC	AAGTTTATAG	AGCCTCAATT	GGATGAAGAC	TTAACTATTT	10050
ATATGAAAGA	TAAAGCATT	TCCCCAAAGA	AATCAAACCTG	GGACACAGTC	10100
TATCCAGCTT	CAAACCTGTT	ATACCGCACT	AATGTGTCTC	ATGATTCACG	10150
AAGATTGGTT	GAAGTATTTA	TAGCAGATAG	TAAATTTGAT	CCCCACCAAG	10200
TATTAGATTA	CGTAGAATCA	GGATATTGGC	TGGATGATCC	TGAATTTAAT	10250
ATCTCATATA	GTTTAAAAGA	GAAAGAAATA	AAACAAGAAG	GTAGACTTTT	10300
TGCAAAAATG	ACATACAAGA	TGAGGGCTAC	ACAAGTATTA	TCAGAAACAT	10350
TATTGGCGAA	TAATATAGGG	AAATTCCTCC	AAGAGAATGG	GATGGTTAAA	10400
GGAGAAATTG	AATTACTCAA	GAGACTAACA	ACAATATCTA	TGTCTGGAGT	10450
TCCGCGGTAT	AATGAGGTAT	ACAATAATTC	AAAAAGTCAC	ACAGAAGAAC	10500
TTCAAGCTTA	TAATGCAATT	AGCAGTTCCA	ATTTATCTTC	TAATCAGAAG	10550
TCAAAGAAGT	TTGAATTTAA	ATCTACAGAT	ATATACAATG	ATGGATACGA	10600
AACCGTAAGC	TGCTTCTTAA	CGACAGATCT	TAAAAAATAT	TGTTTAAATT	10650
GGAGGTATGA	ATCAACAGCT	TTATTCGGTG	ATACTTGTA	TCAGATATTT	10700
GGGTAAAGG	AATTATTTAA	TTGGCTGCAC	CCTCGCCTTG	AAAAGAGTAC	10750
AATATATGTT	GGAGATCCTT	ATTGCCCGCC	ATCAGATATT	GAACATTTAC	10800
CACTTGATGA	CCATCCTGAT	TCAGGATTTT	ATGTTTCATA	TCCTAAAGGA	10850
GGAATAGAAG	GGTTTTGCCA	AAAGTTATGG	ACACTCATAT	CTATCAGTGC	10900
AATACATTTA	GCAGCTGTCA	AAATCGGTGT	AAGAGTTACT	GCAATGGTTC	10950
AAGGGGATAA	TCAAGCCATA	GCTGTTACCA	CAAGAGTACC	TAATAATTAT	11000
GATTATAAAG	TTAAGAAAGA	GATTGTTTAT	AAAGATGTGG	TAAGATTTTT	11050
TGATTCCTTG	AGAGAGGTGA	TGGATGATCT	GGGTCATGAG	CTCAAACATA	11100
ATGAAACTAT	AATAAGTAGT	AAAATGTTTA	TATATAGCAA	AAGGATATAC	11150
TATGACGGAA	GAATCCTTCC	TCAGGCATTA	AAAGCATTGT	CTAGATGTGT	11200
TTTTTGGTCT	GAAACAATCA	TAGATGAGAC	AAGATCAGCA	TCCTCAAATC	11250
TGGCTACATC	GTTTGCAAAG	GCCATTGAGA	ATGGCTACTC	ACCTGTATTG	11300
GGATATGTAT	GCTCAATCTT	CAAAAATATC	CAACAGTTGT	ATATAGCGCT	11350
TGGAATGAAT	ATAAACCCAA	CTATAACCCA	AAATATTAAA	GATCAATATT	11400
TCAGGAATAT	TCATTGGATG	CAATATGCCT	CCTTAATCCC	TGCTAGTGTC	11450
GGAGGATTTA	ATTATATGGC	CATGTCAAGG	TGTTTTGTCA	GAAACATTGG	11500
AGATCCTACA	GTCGCTGCGT	TAGCCGATAT	TAAAAGATTT	ATAAAAGCAA	11550
ATTTGTTAGA	TCGAGGTGTC	CTTTACAGAA	TTATGAATCA	AGAACCAGGC	11600
GAGTCTTCTT	TTTTAGACTG	GGCCTCAGAT	CCCTATTCAT	GTAACCTACC	11650
ACAATCTCAA	AATATAACCA	CCATGATAAA	GAATATAACT	GCAAGAAATG	11700
TACTACAGGA	CTCACCAAAC	CCATTACTAT	CTGGATTATT	TACAAGTACA	11750

FIG. 6E

ATGATAGAAG	AGGATGAGGA	ATTAGCTGAG	TTCCTAATGG	ACAGGAGAAT	11800
AATCCTCCCA	AGAGTTGCAC	ATGACATTTT	AGATAATTCT	CTTACTGGAA	11850
TTAGGAATGC	TATAGCTGGT	ATGTTGGATA	CAACAAAATC	ACTAATTCTGA	11900
GTAGGGATAA	GCAGAGGAGG	ATTAACCTAT	AACTTATTAA	GAAAGATAAG	11950
CAACTATGAT	CTTGTACAAT	ATGAGACACT	TAGTAAAACT	TTAAGACTAA	12000
TAGTCAGTGA	CAAGATTAAG	TATGAAGATA	TGTGCTCAGT	AGACCTAGCC	12050
ATATCATTA	GACAAAAAAT	GTGGATGCAT	TTATCAGGAG	GAAGAATGAT	12100
AAATGGACTT	GAAACTCCAG	ATCCTTTTGA	GTTACTGTCT	GGAGTAATAA	12150
TAACAGGATC	TGAACATTGT	AGGATATGTT	ATTCAACTGA	AGGTGAAAGC	12200
CCATATACAT	GGATGTATTT	ACCAGGCAAT	CTTAATATAG	GATCAGCTGA	12250
GACAGGAATA	GCATCATTAA	GGGTCCCTTA	CTTTGGATCA	GTTACAGATG	12300
AGAGATCTGA	AGCACAATTA	GGGTATATCA	AAAATCTAAG	CAAACCAGCT	12350
AAGGCTGCTA	TAAGAATAGC	AATGATATAT	ACTTGGGCAT	TTGGGAATGA	12400
CGAAATATCT	TGGATGGAAG	CATCACAGAT	TGCACAAACA	CGTGCAAAC	12450
TTACATTGGA	TAGCTTAAAG	ATTTTGACAC	CAGTGACAAC	ATCAACAAAT	12500
CTATCACACA	GGTTAAAAGA	TACTGCTACT	CAGATGAAAT	TTTCTAGTAC	12550
ATCACTTATT	AGAGTAAGCA	GGTTCATCAC	AATATCTAAT	GATAATATGT	12600
CTATTAAAGA	AGCAAATGAA	ACTAAAGATA	CAAATCTTAT	TTATCAACAG	12650
GTAATGTTAA	CAGGATTAAG	TGTATTTGAA	TATCTATTTA	GGTTAGAGGA	12700
GAGTACAGGA	CATAACCCTA	TGGTCATGCA	TCTACATATA	GAGGATGGAT	12750
GTTGTATAAA	AGAGAGTTAC	AATGATGAGC	ATATCAATCC	GGAGTCTACA	12800
TTAGAGTTAA	TCAAATACCC	TGAGAGTAAT	GAATTTATAT	ATGATAAGGA	12850
CCCTTTAAAG	GATATAGATC	TATCAAAATT	AATGGTTATA	AGAGATCATT	12900
CTTATACAAT	TGACATGAAT	TACTGGGATG	ACACAGATAT	TGTACATGCA	12950
ATATCAATAT	GTACTGCAGT	TACAATAGCA	GATACAATGT	CGCAGCTAGA	13000
TCGGGATAAT	CTTAAGGAGC	TGGTTGTGAT	TGCAAATGAT	GATGATATTA	13050
ACAGTCTGAT	AACTGAATTT	CTGACCCTAG	ATATACTAGT	GTTTCTCAA	13100
ACATTTGGAG	GGTTACTCGT	GAATCAATTT	GCATATACCC	TTTATGGATT	13150
GAAAATAGAA	GGAAGGGATC	CCATTTGGGA	TTATATAATG	AGAACATTAA	13200
AAGACACCTC	ACATTCAGTA	CTTAAAGTAT	TATCTAATGC	ACTATCTCAT	13250
CCAAAAGTGT	TTAAGAGATT	TTGGGATTGT	GGAGTTTGA	ATCCTATTTA	13300
TGGTCCTAAT	ACTGCTAGTC	AAGATCAAGT	TAAGCTTGCT	CTCTCGATTT	13350
GCGAGTACTC	CTTGGATCTA	TTTATGAGAG	AATGGTTGAA	TGGAGCATCA	13400
CTTGAGATCT	ATATCTGTGA	TAGTGACATG	GAAATAGCAA	ATGACAGAAG	13450
ACAAGCATTT	CTCTCAAGAC	ATCTTGCCCT	TGTGTGTTGT	TTAGCAGAGA	13500
TAGCATCTTT	TGGACCAAAT	TTATTAAATC	TAACATATCT	AGAGAGACTT	13550
GATGAATTAA	AACAATACTT	AGATCTGAAC	ATCAAAGAAG	ATCCTACTCT	13600
TAAATATGTG	CAAGTATCAG	GACTGTTAAT	TAAATCATTC	CCCTCAACTG	13650
TTACGTATGT	AAGGAAAAC	GCGATTAAGT	ATCTGAGGAT	TCGTGGTATT	13700
AATCCGCCTG	AAACGATTGA	AGATTGGGAT	CCCATAGAAG	ATGAGAATAT	13750
CTTAGACAAT	ATTGTTAAAA	CTGTAAATGA	CAATTGCAGT	GATAATCAA	13800
AGAGAAATAA	AAGTAGTTAT	TTCTGGGGAT	TAGCTCTAAA	GAATTATCAA	13850
GTCGTGAAAA	TAAGATCCAT	AACGAGTGAT	TCTGAAGTTA	ATGAAGCTTC	13900
GAATGTTACT	ACACATGGAA	TGACACTTCC	TCAGGGAGGA	AGTTATCTAT	13950
CACATCAGCT	GAGGTTATTT	GGAGTAAACA	GTACAAGTTG	TCTTAAAGCT	14000
CTTGAATTAT	CACAAATCTT	AATGAGGGAA	GTTAAAAAAG	ATAAAGATAG	14050
ACTCTTTTTTA	GGAGAAGGAG	CAGGAGCTAT	GTTAGCATGT	TATGATGCTA	14100

FIG. 6F

CACTCGGTCC	TGCAATAAAT	TATTATAATT	CTGGTTTAAA	TATTACAGAT	14150
GTAATTGGTC	AACGGGAATT	AAAAATCTTC	CCATCAGAAG	TATCATTAGT	14200
AGGTAAAAAA	CTAGGAAATG	TAACACAGAT	TCTTAATCGG	GTGAGGGTGT	14250
TATTTAATGG	GAATCCCAAT	TCAACATGGA	TAGGAAATAT	GGAATGTGAG	14300
AGTTTAATAT	GGAGTGAATT	AAATGATAAG	TCAATTGGTT	TAGTACATTG	14350
TGACATGGAG	GGAGCGATAG	GCAAATCAGA	AGAAACTGTT	CTACATGAAC	14400
ATTATAGTAT	TATTAGGATT	ACATATTTAA	TCGGGGATGA	TGATGTTGTC	14450
CTAGTATCAA	AAATTATACC	AACTATTACT	CCGAATTGGT	CTAAAATACT	14500
CTATCTATAC	AAGTTGTATT	GGAAGGATGT	AAGTGTAGTG	TCCCTTAAAA	14550
CATCCAATCC	TGCCTCAACA	GAGCTTTATT	TAATTTCAAA	AGATGCTTAC	14600
TGTACTGTAA	TGGAACCCAG	TAATCTTGTT	TTATCAAAAC	TTAAAAGGAT	14650
ATCATCAATA	GAAGAAAATA	ATCTATTAAA	GTGGATAATC	TTATCAAAAA	14700
GGAAGAATAA	CGAGTGGTTA	CAGCATGAAA	TCAAAGAAGG	AGAAAGGGAT	14750
TATGGGATAA	TGAGGCCATA	TCATACAGCA	CTGCAAATTT	TTGGATTCCA	14800
AATTAACCTA	AATCACTTAG	CTAGAGAATT	TTTATCAACT	CCTGATTTAA	14850
CCAACATTAA	TAATATAATT	CAAAGTTTTA	CAAGAACAAT	TAAAGATGTT	14900
ATGTTCGAAT	GGGTCAATAT	CACTCATGAC	AATAAAAGAC	ATAAATTAGG	14950
AGGAAGATAT	AATCTATTCC	CGCTTAAAAA	TAAGGGGAAA	TTAAGATTAT	15000
TATCACGAAG	ATTAGTACTA	AGCTGGATAT	CATTATCCTT	ATCAACCAGA	15050
TTACTGACGG	GCCGTTTTCC	AGATGAAAAA	TTTGAAAATA	GGGCACAGAC	15100
CGGATATGTA	TCATTGGCTG	ATATTGATTT	AGAATCCTTA	AAGTTATTAT	15150
CAAGAAATAT	TGTCAAAAAT	TACAAAGAAC	ACATAGGATT	AATATCATAC	15200
TGGTTTTTGA	CCAAAGAGGT	CAAATACTA	ATGAAGCTTA	TAGGAGGAGT	15250
CAAACACTA	GGAATTCCTA	AACAGTACAA	AGAGTTAGAG	GATCGATCAT	15300
CTCAGGGTTA	TGAATATGAT	AATGAATTTG	ATATTGATTA	ATACATAAAA	15350
ACATAAAATA	AAACACCTAT	TCCTCACCCA	TTCACTTCCA	ACAAAATGAA	15400
AAGTAAGAAA	AACATGTAAT	ATATATATAC	CAAACAGAGT	TTTTCTCTTG	15450
TTTGGT					15456

FIG. 6G

ACCAAACAAG	AGAAGAGACT	TGCTTGGGAA	TATTAATTCA	AATAAAAATT	50
AACTTAGGAT	TAAAGAACTT	TACCGAAAGG	TAAGGGGAAA	GAAATCCTAA	100
GACTGTAATC	ATGTTGAGTC	TATTCGACAC	ATTCAGTGCG	CGTAGGCAGG	150
AGAACATAAC	AAAATCAGCT	GGTGGGGCTG	TTATTCCCGG	GCAAAAAAAC	200
ACTGTGTCTA	TATTTGCTCT	TGGACCATCA	ATAACAGATG	ACAATGACAA	250
AATGACATTG	GCTCTTCTCT	TTTTGTCTCA	TTCTTTTAGAC	AATGAAAAGC	300
AGCATGCGCA	AAGAGCTGGA	TTTTTAGTTT	CTCTGTTATC	AATGGCTTAT	350
GCCAACCCAG	AATTATATTT	AACATCAAAT	GGTAGTAATG	CAGATGTTAA	400
ATATGTCATC	TACATGATAG	AGAAAGACCC	AGGAAGACAG	AAATATGGTG	450
GGTTTGTCTG	CAAGACTAGA	GAGATGGTTT	ATGAAAAGAC	AACTGACTGG	500
ATGTTTGGA	GTGATCTTGA	GTATGATCAA	GACAATATGT	TGCAAAATGG	550
TAGAAGCACT	TCTACAATCG	AGGATCTTGT	TCATACTTTT	GGATATCCAT	600
CGTGTCTTGG	AGCCCTTATA	ATCCAGGTTT	GGATAATACT	TGTTAAGGCT	650
ATAACCAGTA	TATCAGGATT	GAGGAAAGGA	TTCTTTTACTC	GGTTAGAAGC	700
ATTTGACAA	GATGGAACAG	TTAAATCCAG	TCTAGTGTTG	AGCGGTGATG	750
CAGTAGAACA	AATTGGATCA	ATTATGAGGT	CCCAACAGAG	CTTGGTAACA	800
CTCATGGTTG	AAACACTGAT	AACAATGAAC	ACAGGCAGGA	ATGACCTGAC	850
AACAATAGAA	AAGAATATAC	AGATTGTAGG	AAACTACATC	AGAGATGCAG	900
GTCTTGCTTC	ATTTTTCAAC	ACAATCAGAT	ATGGCATTGA	GACTAGAATG	950
GCAGCTCTAA	CTCTGTCTAC	CCTTAGACCG	GACATCAACA	GACTCAAGGC	1000
ACTGATAGAG	CTATATCTAT	CAAAGGGGCC	ACGTGCTCCT	TTTATATGCA	1050
TTTTGAGAGA	TCCTGTGCAT	GGTGAGTTTG	CACCAGGCAA	CTATCCTGCC	1100
CTCTGGAGTT	ATGCGATGGG	TGTAGCAGTT	GTACAAAACA	AGGCCATGCA	1150
ACAGTATGTA	ACAGGAAGGT	CCTATCTGGA	TATTGAAATG	TTCCAAC TGG	1200
GTCAAGCAGT	GGCACGTGAC	GCCGAGTCGC	AGATGAGTTC	AATATTAGAG	1250
GATGAACTGG	GGGTCACACA	AGAAGCCAAG	CAAAGCTTGA	AGAAACACAT	1300
GAAGAACATC	AGCAGTTCAG	ATACAACCTT	CTATAAGCCT	ACAGGGGGAT	1350
CAGCCATAGA	AATGGCAATA	GATGAGGAAG	CAGAGCAGCC	CGAATCCAGA	1400
GGAGACCAAG	ACCAAGGAGA	TGAACCTCGG	TCATCCATAG	TTCCTTATGC	1450
ATGGGCAGAC	GAAACCGGGA	ATGACAACCA	AACTGAATCA	ACCACAGAAA	1500
TTGACAGCAT	CAAAACTGAA	CAAAGAAACA	TCAGAGACAG	GCTGAACAAA	1550
AGACTCAACG	AGAAAAGGAA	ACAGAGTAAC	CCGGGATCAA	CTGACATCAC	1600
AAACAACACA	AATCAAAC T G	AAATAGATGA	TTTATT CAGT	GCATT C G G A	1650
GCAACTAGTC	ACAAAGAGAT	GACCACCATC	ATCAGCAACA	AGTAAGAAAA	1700
ACTTAGGATT	AATGGAAATT	ATCCAATCCG	GAGACGGAAG	GACAAATCCA	1750
GAATCCAACC	ACAAC TCAAT	CAACCA A G A	TTCATGGAAG	ACAATGTTCA	1800
AAACAATCAA	ATCATGGATT	CTTGGGAAGA	GGGATCAGGA	GATAAATCAT	1850
CTGACATCTC	ATCGGCCCTC	GACATCATTG	AATT CATACT	CAACACCGAC	1900
TCCCAAGAGA	ACACGGCAGA	CAGCAATGAA	ATCAACACAG	GAGCCACAAG	1950
ACTTAGCACG	ACAATCTACC	AACTTGAGTC	CAAAACAACA	GAAACAAGCA	2000
AGGAAAATAG	TGGACCAGCT	AACAAA AATC	GACAGTTTGG	GGCATCACAC	2050
GAACGTGCCA	CAGAGACAAA	AGATAGAAAT	GTTAATCAGA	AGACTGTACA	2100
GGGAGGATAT	AGGAGAGGAA	GCAGCCCAGA	TAGTAGAACT	GAGACTATGG	2150
TCACTCGAGG	AATCTCCAGA	AGCAGCCCAG	ATCCTAACAA	TGGAACCCAA	2200
ATCCAGGAAG	ATATTGATTA	CAATGAAGTT	GGAGAGATGG	ATAAGGACTC	2250
TACTAAGAGG	GAAATGCGAC	AATTTAAAGA	TGTTCCAGTC	AAGGTATCAG	2300
GAAGTGATGC	CATTCCTCCA	ACAAAACAAG	ATGGAGACGG	TGATGATGGA	2350

FIG. 7A

AGAGGCCTGG	AATCTATCAG	TACATCTGAT	TCAGGATATA	CCAGTATAGT	2400
GACTGCCGCA	ACACTAGATG	ACGAAGAAGA	ACTCCTTATG	AAGAACAACA	2450
GGCCAAGAAA	GTATCAATCA	ACACCCCAGA	ACAGTGACAA	GGGAATTAAA	2500
AAAGGGAGTG	GAAGGCCAAA	AGACACAGAC	AAACAATCAC	CAATATTGGA	2550
CTACGAACTC	AACTCCAAAG	GATCGAAGAA	GAGCCAGAAA	ATCCTCAAAG	2600
CCAGCACGAA	TACAGGAGAA	CCAACAAGAT	CACAGAGTGG	ATCCCAGGGG	2650
AAGAGAATCA	CATCCTGGAA	CATCCTCAAC	AGCGAGAGCG	GCAATCGAGC	2700
AGAATCAACA	AACCAAACCC	ATCAGACATC	AATCTCGGGA	CAGAACCACA	2750
CAATGGGACC	AAGCAGAACA	ACCTCAGAAC	CAAGGACCAA	GACACAAAAG	2800
ACGGATGGAA	AGGAAAGAGA	GGACACAGAA	GAGAGCACTC	GATTTACAGA	2850
AAGGGCGATT	ACATTATTAC	AGAATCTTGG	TGTAATCCAA	TCTGCAGCAA	2900
AATTAGACCT	ATACCAAGAC	AAGAGAGTTG	TGTGTGTGGC	GAATGTCCTA	2950
AACAATGCAG	ATACTGCATC	AAAGATAGAC	TTCCTAGCAG	GTTTGATGAT	3000
AGGAGTGTCA	ATGGATCATG	ATGTCAAATT	AAATCAGATT	CAGAACGAGA	3050
TATTAAGTTT	AAAAACTGAT	CTTAAGAAGA	TGGATGAATC	ACATAGAAGA	3100
CTAATTGAGA	ATCAAAAAGA	ACAATTATCA	CTGATCACAT	CATTAATCTC	3150
AAATCTTAAA	ATCATGACAG	AGAGAGGAGG	GAAGAAGGAC	CAACCAGAAC	3200
CTAGCGGGAG	GACATCCATG	ATCAAGACAA	AGGCAAAAGA	AGAGAGAATA	3250
AAGAAAGTCA	GGTTTGACCC	TCTTATGGAA	ACACAGGGCA	TCGAGAAAAA	3300
CATCCCTGAC	CTCTACAGAT	CAATAGAGAA	AACACCAGAA	AACGACACAC	3350
AGATCAAATC	AGAAATAAAC	AGATTGAATG	ATGAATCCAA	TGCCACTAGA	3400
TTAGTACCTA	GAAGAATAAG	CAGTACAATG	AGATCACTAA	TAATAATCAT	3450
CAACAACAGC	AATTTATCAT	CAAAAGCAAA	GCAATCATAC	ATCAACGAAC	3500
TCAAGCTCTG	CAAGAGTGAT	GAGGAAGTGT	CTGAGTTGAT	GGACATGTTC	3550
AATGAGGATG	TCAGCTCCCA	GTAAACCGCC	AACCAAGGGT	CAACACCAAG	3600
AAAACCAACA	GCACAAAACA	GCCAATAAGA	GACCATCCCA	ACACACCGAA	3650
CCAATCAACA	CATAACAAAG	ATCTTTAGAT	CATAGATGAC	TAAGAAAAAC	3700
TTAGGATGAA	AGGACTGATC	AATCCTCCAA	AACAATGAGC	ATCACCAGCT	3750
CCACAATCTA	CACATTCCCA	GAATCCTCTT	TCTCCGAGAA	TGGCAACATA	3800
GAGCCGTTAC	CACTCAAGGT	CAATGAACAG	AGAAAGGCCA	TACCTCATAT	3850
TAGGGTTGTC	AAGATAGGAG	ATCCGCCCAA	ACATGGATCC	AGATATCTGG	3900
ATGTCTTTTT	ACTGGGCTTC	TTTGAAATGG	AAAGGTCAAA	AGACAGGTAT	3950
GGGAGCATAA	GTGATCTAGA	TGATGATCCA	AGTTACAAGG	TTTGTGGCTC	4000
TGGATCATTG	CCACTTGGGT	TGGCTAGATA	CACTGGAAAT	GATCAGGAAC	4050
TCCTACAGGC	TGCAACCAAG	CTCGATATAG	AAGTAAGAAG	AACTGTAAAG	4100
GCTACGGAGA	TGATAGTTTA	CACTGTGCAA	AACATCAAAC	CTGAACTATA	4150
TCCATGGTCC	AGTAGATTAA	GAAAAGGGAT	GTTATTTGAC	GCTAACAAGG	4200
TTGCACTTGC	TCCTCAATGT	CTTCCACTAG	ATAGAGGGAT	AAAATTCAGG	4250
GTGATATTTG	TGAACTGCAC	AGCAATTGGA	TCAATAACTC	TATTCAAAAT	4300
CCCCAAGTCC	ATGGCATTGT	TATCATTGCC	TAATACAATA	TCAATAAATC	4350
TACAAGTACA	TATCAAAACA	GGAATTCAGA	CAGATTCCAA	AGGAGTAGTT	4400
CAGATTCTAG	ATGAAAAAGG	TGAAAAATCA	CTAAATTTCA	TGGTTCATCT	4450
CGGGTTGATC	AAAAGGAAGA	TGGGTAGAAT	GTAATCAGTT	GAATATTGTA	4500
AGCAGAAGAT	TGAGAAGATG	AGATTATTAT	TCTCATTGGG	ATTAGTTGGA	4550
GGGATCAGCT	TCCACGTCAA	CGCAACTGGC	TCTATATCAA	AGACATTAGC	4600
AAGTCAATTA	GCATTTAAAA	GAGAAATCTG	CTATCCCCTA	ATGGATCTGA	4650
ATCCACACTT	AAATTTAGTT	ATATGGGCAT	CATCAGTTGA	AATTACAAGA	4700

FIG. 7B

GTAGATGCCAA	TTCTCCAGCC	TTCATTACCT	GGCGAATTCA	GATACTACCC	4750
AAACATCATA	GCAAAAGGGG	TCGGGAAAT	CAGACAGTAA	AACCAACAAC	4800
CCTGACATCC	AACACTGCAA	ATCAGGCTAC	CCACAGGAGA	AAAATCAAAA	4850
ACTTAGGATC	AAAGGGATCA	CCACAAACCC	CGGGAAACAG	CCAAACCAAC	4900
CAACACACAA	ATCACAGACA	AAAAGGAAAA	GGCACTGCAA	AGACCGAGAA	4950
CAAGCAGAAC	GCACACAACC	AAGCAGAGGA	AAGCCAAAGC	CCGCCATTCA	5000
CAAACACACC	AACAATCCTA	CAAACAAGCA	CCAAAATAGA	GGTCAAAAGA	5050
CAAAGAGCAT	CAGATATGAC	CATCACAACC	ATAATCATAG	CCATACTACT	5100
AATACCCCTA	TCATTCTGTC	AAATAGACAT	AACAAAAC TG	CAACGTGTAG	5150
GTGTATTAGT	CAACAATCCC	AAAGGCATGA	AAATTTTACA	AAATTTTGAA	5200
ACGAGATACC	TGATATTAAG	TCTGATACCC	AAAATAGAGA	ATTCACACTC	5250
ATGTGGGGAT	CAACAGATAA	ACCAATACAA	GAAGTTATTG	GATAGATTGA	5300
TAATTCCTCT	ATATGATGGA	TTAAAATTAC	AAAAAGATGT	AATAGTAGTA	5350
AGTCATGAAA	CCCATAATAA	TACTAATCTT	AGGACAAAAC	GATTCTTTGG	5400
AGAGATAAAT	GGGACAATTG	CGATAGGGAT	AGCCACCTCA	GCGCAAATCA	5450
CCGCAGCAGT	CGCTCTTGTC	GAAGCTAAAC	AGGCAAGGTC	AGACATAGAA	5500
AAACTCAAAG	AAGCTATAAG	AGACACAAAC	AAGGCAGTAC	AATCGATTCA	5550
AAGTTCTGTA	GGTAACCTAA	TTGTTGCAGT	TAAATCAGTT	CAAGACTATG	5600
TCAACAATGA	AATTGTACCT	TCAATCACAA	GATTAGGCTG	TGAAGCAGCA	5650
GGGTTACAAT	TGGGAATTGC	ACTGACACAA	CATTACTCAG	AATTAACAAA	5700
TATATTTGGT	GATAATATAG	GAACACTGAA	AGAAAAAGGG	ATAAAATTAC	5750
AGGGGATAGC	ATCGTTATAT	CATACAAACA	TAACAGAAAT	ATTTACTACT	5800
TCAACAGTTG	ACCAATATGA	TATTTATGAC	CTATTATTCA	CTGAATCAAT	5850
CAAGATGAGA	GTGATAGATG	TTGATTTGAG	TGATTACTCA	ATTACTCTTC	5900
AAGTTAGACT	TCCTTTATTA	ACTAAACTAT	CAAATACTCA	GATTTATAAA	5950
GTAGATTCTA	TATCATACAA	CATCCAGGGC	AAAGAGTGGT	ATATTCCTCT	6000
TCCCAATCAC	ATCATGACAA	AAGGGGCTTT	TCTAGGTGGT	GCTGATATTA	6050
AAGAATGCAT	AGAGGCATTC	AGCAGTTATA	TATGTCCTTC	TGATCCAGGT	6100
TATATATTAA	ATCACGAGAT	AGAGAATTGT	TTATCAGGGA	ACATAACACA	6150
GTGTCCTAAG	ACTGTTGTTA	CATCAGATGT	GGTACCACGA	TACGCGTTTG	6200
TGAATGGTGG	ATTAATTGCA	AACTGCATAA	CAACTACATG	TACATGCAAT	6250
GGAATTGACA	ATAGAATTAA	TCAATCACCT	GATCAAGGAA	TTAAGATCAT	6300
AACACATAAA	GAATGCCAGG	TAATAGGTAT	AAACGGAATG	TTATTCAATA	6350
CTAATAGAGA	AGGGACATTA	GCAACTTATA	CATTTGATGA	CATTATATTA	6400
AATAACTCTG	TTGCACTTAA	TCCAATTGAT	ATATCTATGG	AACTTAACAA	6450
GGCAAAACTA	GAATTAGAAG	AATCGAAGGA	ATGGATAAAG	AAATCAAATC	6500
AAAAGTTAGA	TTCCGTTGGA	AGTTGGTATC	AATCTAGTGC	AACAATCACC	6550
ATAATCATAG	TGATGATAAT	AATTCTATTT	ATAATCAATA	TAACAATTAT	6600
TGTAGTCATA	ATCAAATTCT	ATAGAATTAA	GGGGGAAAAT	CAAAACGACA	6650
AAAACAGTGA	GCCGTATATA	CTGACAAATA	GACAATAAGA	CTATACACGA	6700
TCAAATATAG	AAAGTACAAA	AAACTTAGGA	ACAAAGTTGT	TCAACACAGC	6750
AGCAGCGAAC	AGACCCAAAG	GCAGCGCAGA	GGCGACACCG	AACCCAAAAA	6800
TGGAATATTG	GAAACACACA	AACAGCACAA	AAAACACCAA	CAATGAAACC	6850
GAAACAACCA	GAGGCAAACA	CAGTAGCAAG	GTTACAAATA	TCATAATGTA	6900
CACCTTCTGG	ACAATAACAT	CAACAATATT	ATTAGTCATT	TTTATAATGA	6950
TATTGACAAA	CTTAATTCAA	GAGAACAATC	ATAATAAATT	AATGTTGCAG	7000
GAAATAAGAA	AAGAATTCGC	GGCAATAGAC	ACCAAGATTC	AGAGGACCTC	7050

FIG. 7C

GGATGACATT	GGAACCTCAA	TACAGTCAGG	AATAAATACA	AGACTTCTCA	7100
CAATTCAGAG	TCATGTTCAA	AACTATATCC	CACTATCACT	AACACAACAA	7150
ATGTCAGATC	TCAGAAAATT	TATCAATGAT	CTAACAAATA	AAAGAGAACA	7200
TCAAGAAGTG	CCAATACAGA	GAATGACTCA	TGATAGAGGT	ATAGAACCCC	7250
TAAATCCAGA	CAAGTTCTGG	AGGTGTACAT	CTGGTAACCC	ATCTCTAACA	7300
AGTAGTCCTA	AGATAAGGTT	AATACCAGGG	CCAGGTTTAT	TAGCAACATC	7350
TACTACAGTA	AATGGCTGTA	TTAGAATCCC	ATCGTTAGCA	ATCAATCATT	7400
TAATCTACGC	TTACACCTCT	AATCTTATCA	CCCAGGGCTG	TCAAAATATA	7450
GGGAAATCTT	ACCAAGTACT	ACAAATAGGG	ATAATTACTA	TAAATTCGGA	7500
CCTAGTACCT	GATTTAAATC	CCAGAGTCAC	ACATACATTT	AATATTGATG	7550
ATAATAGGAA	ATCTTGCTCT	CTGGCACTAT	TGAATACAGA	TGTTTATCAG	7600
TTATGCTCAA	CACCAAAAGT	TGATGAGAGA	TCCGATTATG	CATCAACAGG	7650
TATTGAGGAT	ATTGTACTTG	ACATTGTCAC	TAATAATGGA	TTAATTATAA	7700
CAACAAGGTT	TACAAATAAT	AATATAACTT	TTGATAAACC	GTATGCAGCA	7750
TTGTATCCAT	CAGTAGGACC	AGGAATCTAT	TATAAGGGTA	AAGTTATATT	7800
TCTCGGATAT	GGAGGTCTAG	AGCATGAAGA	AAACGGAGAC	GTAATATGTA	7850
ATACAACCTGG	TTGTCCTGGC	AAAACACAGA	GAGACTGTAA	TCAGGCTTCT	7900
TATAGCCCAT	GGTTCTCAAA	TAGGAGAATG	GTAAACTCTA	TTATTGTTGT	7950
TGATAAAGGC	ATAGATGCAA	CTTTTAGCTT	GAGGGTGTGG	ACTATTCCAA	8000
TGAGCCAAAA	TTATTGGGGA	TCAGAAGGAA	GATTACTTTT	ATTAGGTGAC	8050
AGAATATACA	TATATACTAG	ATCCACAAGT	TGGCACAGTA	AATTACAGTT	8100
AGGGGTAATT	GATATTTCTG	ATTATAATAA	TATAAGAATA	AATTGGACTT	8150
GGCATAATGT	ACTATCACGG	CCAGGAAATG	ATGAATGTCC	ATGGGGTCCAT	8200
TCATGCCCAG	ACGGATGTAT	AACAGGAGTT	TACACTGATG	CATATCCGCT	8250
AAACCCATCG	GGGAGTGTTG	TATCATCAGT	AATTCTTGAC	TCACAAAAGT	8300
CTAGAGAAAA	CCCAATCATT	ACCTACTCAA	CAGCTACAAA	TAGAATAAAT	8350
GAATTAGCTA	TATATAACAG	AACACTTCCA	GCTGCATATA	CAACAACAAA	8400
TTGTATCACA	CATTATGATA	AAGGGTATTG	TTTTTCATATA	GTAGAAATAA	8450
ATCACAGAAG	TTTGAATACG	TTTCAACCTA	TGTTATTCAA	AACAGAAGTT	8500
CCAAAAAACT	GCAGCTAAAT	TGATCATCGC	ATATCGGATG	CCAGATGACA	8550
TTAAAAGAGA	CCACCAGACA	GACAACACAG	GAGATGATGC	AAGATATAAA	8600
GGAATAATAA	AAAACCTTAGG	AGAAAAGTGT	GCAAGAAAAA	TGGACACTGA	8650
ATCCACACAGC	GGCACAACAT	CTGACATTCT	GTACCCTGAA	TGTCACCTCA	8700
ATTCTCCTAT	AGTTAAAGGA	AAAATAGCAC	AACTGCATAC	AATAATGAGT	8750
TTGCCCAAC	CCTACGATAT	GGATGATGAT	TCAATACTGA	TTATTACTAG	8800
ACAAAAAATC	AAACTCAATA	AATTAGATAA	AAGACAACGG	TCAATTAGGA	8850
AATTAAGATC	AGTCTTAATG	GAAAGAGTAA	ATGATCTTGG	TAAATACACC	8900
TTTATCAGAT	ATCCAGAAAT	GTCTAGTGAA	ATGTTCCAAT	TATGTATACC	8950
CGGAATTAAT	AATAAAATAA	ATGAATTGCT	AAGTAAAGCA	AGTAAAACAT	9000
ATAATCAAAT	GACTGATGGA	TTAAGAGATC	TATGGGTTAC	TGTACTATCG	9050
AAGTTAGCAT	CGAAAAATGA	TGGAAGTAAT	TATGATATCA	ATGAAGATAT	9100
TAGCAATATA	TCAAATGTTC	ACATGACTTA	CCAATCAGAC	AAATGGTATA	9150
ATCCATTCAA	GACATGGTTT	ACTATTAAGT	ATGACATGAG	GAGATTACAA	9200
AAAGCCAAAA	ATGAGATTAC	ATTCAATAGG	CATAAAGATT	ATAATCTATT	9250
AGAAGACCAA	AAGAATATAT	TGCTGATACA	TCCAGAACTC	GTCTTAATAT	9300
TAGATAAACA	AAATTACAAT	GGGTATATAA	TGACTCCTGA	ATTGGTACTA	9350
ATGTATTGTG	ATGTAGTTGA	AGGGAGGTGG	AATATAAGTT	CATGTGCAAA	9400

FIG. 7D

ATTGGATCCT	AAATTACAAT	CAATGTATTA	TAAAGGTAAC	AATTTATGGG	9450
AAATAATAGA	TGGACTATTC	CTGACCTTAG	GAGAAAGAAC	ATTTGACATA	9500
ATATCACTAT	TAGAACCGCT	TGCATTATCG	CTCATTCAAA	CTCATGACCC	9550
GGTTAAACAG	CTCAGAGGGG	CTTTTTTAAA	TCACGTGTTA	TCAGAAATGG	9600
AATCAATATT	CGCAGCTGAG	TGTACAACAG	AGGAAATACC	TAATGTGGAT	9650
TATATAGATA	AAATTTTAGA	TGTATTCAAA	GAATCAACAA	TAGATGAAAT	9700
AGCAGAAATT	TTCTCTTTCT	TCCGAACCTT	TGGACACCCT	CCATTAGAGG	9750
CGAGTATAGC	AGCAGAGAAA	GTTAGAAAGT	ATATGTACAC	TGAGAAATGT	9800
TTGAAATTTG	ATACTATCAA	TAAATGTCAT	GCTATTTTTT	GTACAATAAT	9850
TATAAATGGA	TATAGAGAAA	GACATGGTGG	TCAATGGCCT	CCAGTTACAT	9900
TACCTATTCA	TGCACATGAA	TTTATCATAA	ATGCGTACGG	ATCAAATTCT	9950
GCCATATCAT	ATGAAAATGC	TGTAGATTAT	TATAAGAGCT	TCATAGGAAT	10000
AAAATTTGAC	AAGTTTATAG	AGCCTCAATT	GGATGAAGAC	TTAACTATTT	10050
ATATGAAAGA	TAAAGCATT	TCCCCAAAGA	AATCTAACTG	GGACACAGTC	10100
TATCCAGCTT	CAAACCTGTT	ATACCGCACT	AATGTGTCTC	ATGATTCACG	10150
AAGATTGGTT	GAAGTATTTA	TAGCAGATAG	TAAATTTGAT	CCCCACCAAG	10200
TATTAGATTA	CGTAGAATCA	GGATATTGGC	TAGATGATCC	TGAATTTAAT	10250
ATCTCATATA	GTTTAAAAGA	GAAAGAAATA	AAACAAGAAG	GTAGACTTTT	10300
TGCAAAAATG	ACATACAAGA	TGAGAGCTAC	ACAAGTATTA	TCAGAAACAT	10350
TATTGGCGAA	TAATATAGGG	AAATTCTTCC	AAGAGAATGG	GATGGTTAAA	10400
GGAGAAATTG	AATTACTCAA	GAGACTGACA	ACAATATCTA	TGTCTGGGGT	10450
TCCGCGGTAT	AATGAGGTAT	ACAATAATTC	AAAAAGTCAC	ACAGAGGAAC	10500
TTCAAGCTTA	TAATGCAATT	AGCAGTTCCA	ATTTATCTTC	TAATCAGAAG	10550
TCAAAGAAGT	TTGAATTTAA	ATCAACAGAT	ATATACAATG	ATGGATACGA	10600
AACCGTAAGC	TGCTTCTTAA	CGACAGATCT	TAAAAAATAT	TGTTTAAATT	10650
GGAGGTATGA	ATCAACAGCT	TTATTCGGTG	ATACTTGTA	TCAGATATTT	10700
GGGTAAAGG	AATTATTTAA	TTGGCTGCAC	CCTCGCCTTG	AAAAGAGTAC	10750
AATATATGTT	GGAGATCCTT	ATTGCCCGCC	ATCAGATATT	GAACATTTAC	10800
CACTTGATGA	CCATCCTGAT	TCAGGATTTT	ATGTTCCATA	TCCTAAAGGA	10850
GGAATAGAAG	GGTTTTGCCA	AAAGTTATGG	ACACTCATAT	CTATCAGTGC	10900
CATACATTTA	GCAGCTGTCA	AAATCGGTGT	AAGAGTTACT	GCAATGGTTC	10950
AAGGGGATAA	TCAAGCCATA	GCTGTTACCA	CCAGAGTACC	TAATAATTAT	11000
GATTATAAGG	TTAAGAAAGA	GATTGTTTAT	AAAGATGTGG	TAAGATTTTT	11050
TGATTCTTTG	AGAGAGGTTA	TGGATGATCT	GGGTCATGAG	CTCAAACATA	11100
ATGAAACTAT	AATAAGTAGT	AAAATGTTTA	TATATAGCAA	AAGGATATAC	11150
TATGACGGAA	GAATCCTTCC	TCAGGCGTTA	AAAGCATTGT	CTAGATGTGT	11200
TTTTTGGTCT	GAAACAATCA	TAGATGAGAC	AAGATCAGCA	TCCTCAAATC	11250
TGGCGACATC	GTTTGCAAAG	GCCATTGAGA	ATGGCTACTC	ACCTGTATTG	11300
GGATATGTAT	GCTCAATCTT	CAAAAATATC	CAACAGTTGT	ATATAGCACT	11350
TGGAATGAAT	ATAAATCCAA	CTATAACCCA	AAATATTAAA	GATCAATATT	11400
TCAGGAATAT	TCATTGGATG	CAATATGCAT	CTCTAATCCC	TGCTAGTGTC	11450
GGAGGATTTA	ATTATATGGC	CATGTCAAGG	TGTTTTGTCA	GAAACATTGG	11500
AGATCCTACA	GTCGCTGCAT	TAGCTGATAT	TAAAAGATTT	ATAAAAGCAA	11550
ATTTGTTAGA	TCGAGGTGTC	CTTTACAGAA	TTATGAATCA	GGAACCAGGC	11600
GAGTCCTCCT	TTTTAGACTG	GGCTTCAGAC	CCCTATTCAT	GTAACCTACC	11650
ACAATCTCAA	AATATAACCA	CCATGATAAA	GAATATAACT	GCAAGAAATG	11700
TACTACAGGA	CTCACCAAAC	CCATTACTAT	CTGGATTATT	TACAAGTACA	11750

FIG. 7E

ATGATAGAAG	AGGATGAGGA	ATTAGCTGAG	TTCCTAATGG	ACAGGAGAAT	11800
AATTCTCCCA	AGGGTTGCGC	ATGACATTTT	AGATAATTCT	CTTACTGGAA	11850
TTAGGAATGC	TATAGCTGGT	ATGTTGGATA	CAACAAAATC	ACTAATTCGA	11900
GTAGGGATAA	ACAGAGGAGG	ATTAACCTAT	AACTTATTAA	GAAAGATAAG	11950
CAACTATGAT	CTTGTACAAT	ATGAGACACT	TAGTAAAACT	TTAAGACTAA	12000
TAGTCAGTGA	CAAGATTAAG	TATGAAGATA	TGTGCTCAGT	AGACCTAGCC	12050
ATATCATTAA	GACAAAAAAT	GTGGATGCAT	TTATCAGGAG	GAAGAATGAT	12100
AAATGGACTT	GAAACTCCAG	ATCCTTTAGA	GTTACTGTCT	GGAGTAATAA	12150
TAACAGGATC	TGAGCATTGT	AGGATATGTT	ATTCAACTGA	AGGTGAAAGC	12200
CCATATACAT	GGATGTATTT	ACCAGGCAAT	CTTAATATAG	GATCAGCTGA	12250
AACAGGAATA	GCATCATTAA	GGGTCCCTTA	CTTTGGATCA	GTTACGGATG	12300
AGAGATCTGA	AGCACAAATTG	GGGTATATCA	AAAATCTAAG	CAAACCAGCT	12350
AAGGCTGCTA	TAAGAATAGC	AATGATATAT	ACTTGGGCAT	TTGGGAATGA	12400
CGAAATATCT	TGGATGGAAG	CATCACAGAT	TGCACAAACA	CGTGCGAACT	12450
TTACATTAGA	TAGCTTAAAG	ATTTTGACAC	CAGTGACAAC	ATCAACAAAT	12500
CTATCACATA	GGTTAAAAGA	TACTGCTACT	CAGATGAAAT	TTTCTAGTAC	12550
ATCACTTATT	AGAGTAAGCA	GGTTCATCAC	AATATCTAAT	GATAATATGT	12600
CTATTAAAGA	GGCAAATGAA	ACTAAAGATA	CAAATCTTAT	TTATCAACAG	12650
GTAATGTAA	CAGGGTTAAG	TGTATTTGAA	TATCTATTTA	GGTTAGAGGA	12700
GAGTACAGGA	CATAACCCTA	TGGTCATGCA	TCTACATATA	GAGGATGGAT	12750
GTTGTATCAA	AGAGAGTTAC	AATGATGAGC	ATATCAATCC	GGAGTCTACA	12800
TTAGAGTTAA	TTAAATACCC	TGAGAGTAAT	GAATTTATAT	ATGATAAGGA	12850
CCCTTTAAAG	GATATAGATC	TATCAAAATT	AATGGTTATA	AGAGATCATT	12900
CTTATACAAT	TGACATGAAT	TACTGGGACG	ACACAGATAT	TGTACATGCA	12950
ATATCAATAT	GTACTGCAGT	TACAATAGCA	GATACAATGT	CGCAGCTAGA	13000
TCGGGATAAT	CTTAAGGAGC	TGGTTGTAAT	TGCAAAATGAT	GATGATATTA	13050
ACAGTCTGAT	AACTGAATTT	CTGACCCTAG	ATATACTAGT	GTTTCTCAAA	13100
ACATTTGGAG	GGTTACTCGT	GAATCAATTT	GCATATACCC	TTTATGGATT	13150
GAAAATAGAA	GGAAGGGATC	CCATTTGGGA	TTATATAATG	AGAACATTAA	13200
AAGACACCTC	ACATTCAGTA	CTTAAAGTAT	TATCTAATGC	ACTATCTCAT	13250
CCAAAAGTGT	TTAAGAGATT	TTGGGATTGT	GGAGTTTGA	ATCCTATTTA	13300
TGGTCCTAAT	ACTGCTAGTC	AGGACCAAGT	TAAGCTTGCT	CTCTCAATTT	13350
GCGAGTACTC	CTTGGATCTA	TTTATGAGAG	AATGGCTGAA	TGGAGCATCA	13400
CTTGAGATCT	ATATCTGTGA	TAGTGACATG	GAAATAGCAA	ATGATAGAAG	13450
ACAAGCATTT	CTCTCAAGAC	ACCTTGCCTT	TGTGTGTTGT	TTAGCAGAGA	13500
TAGCATCTTT	TGGACCAAAT	TTATTAAATC	TAACATATCT	AGAGAGACTT	13550
GACGAATTAA	AACAATACTT	GGATCTGAAC	ATCAAAGAAG	ATCCTACTCT	13600
TAAATATGTG	CAAGTATCAG	GACTGTTAAT	TAAATCATTC	CCCTCAACTG	13650
TTACGTATGT	GAGGAAAAC	GCGATTAAGT	ATCTGAGGAT	TCGTGGCATT	13700
AATCCGCCTG	AAACGATTGA	AGATTGGGAT	CCCATAGAAG	ATGAGAATAT	13750
CTTAGACAAT	ATTGTTAAAA	CTGTAAATGA	CAATTGCAGT	GATAATCAAA	13800
AGAGAAATAA	AAGTAGTTAT	TTCTGGGGAT	TAGCTCTAAA	GAATTATCAA	13850
GTCGTAAAAA	TAAGATCCAT	AACGAGTGAT	TCTGAAGTTA	ATGAAGCTTC	13900
GAATGTTACT	ACACATGGAA	TGACACTTCC	TCAGGGAGGA	AGTTATCTAT	13950
CACATCAGCT	GAGGTTATTT	GGAGTAAACA	GTACAAGTTG	TCTGAAAGCT	14000
CTTGAATTGT	CACAAATTTT	AATGAGGGAA	GTTAAAAAAG	ATAAAGATAG	14050
ACTCTTTTTA	GGAGAAGGAG	CAGGAGCTAT	GTTAGCATGT	TATGATGCTA	14100

FIG. 7F

Figure 8A

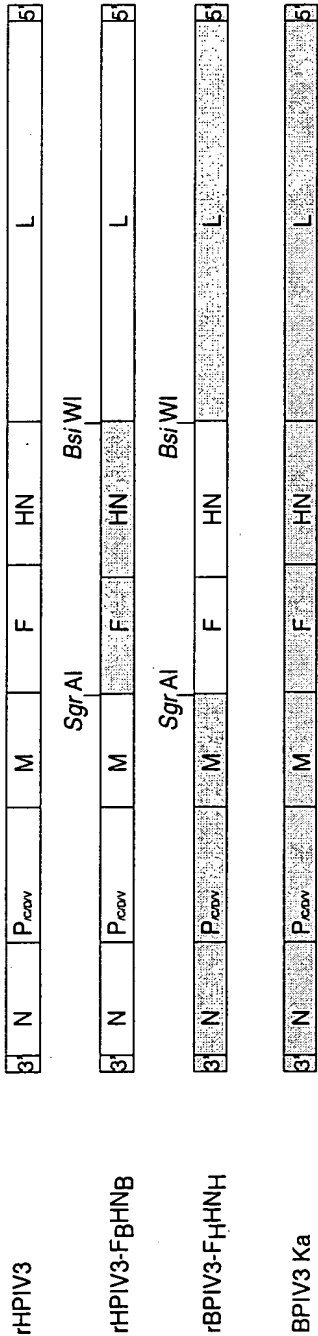


Figure 8B

Assembly of an antigenomic cDNA for BPIV3 Ka

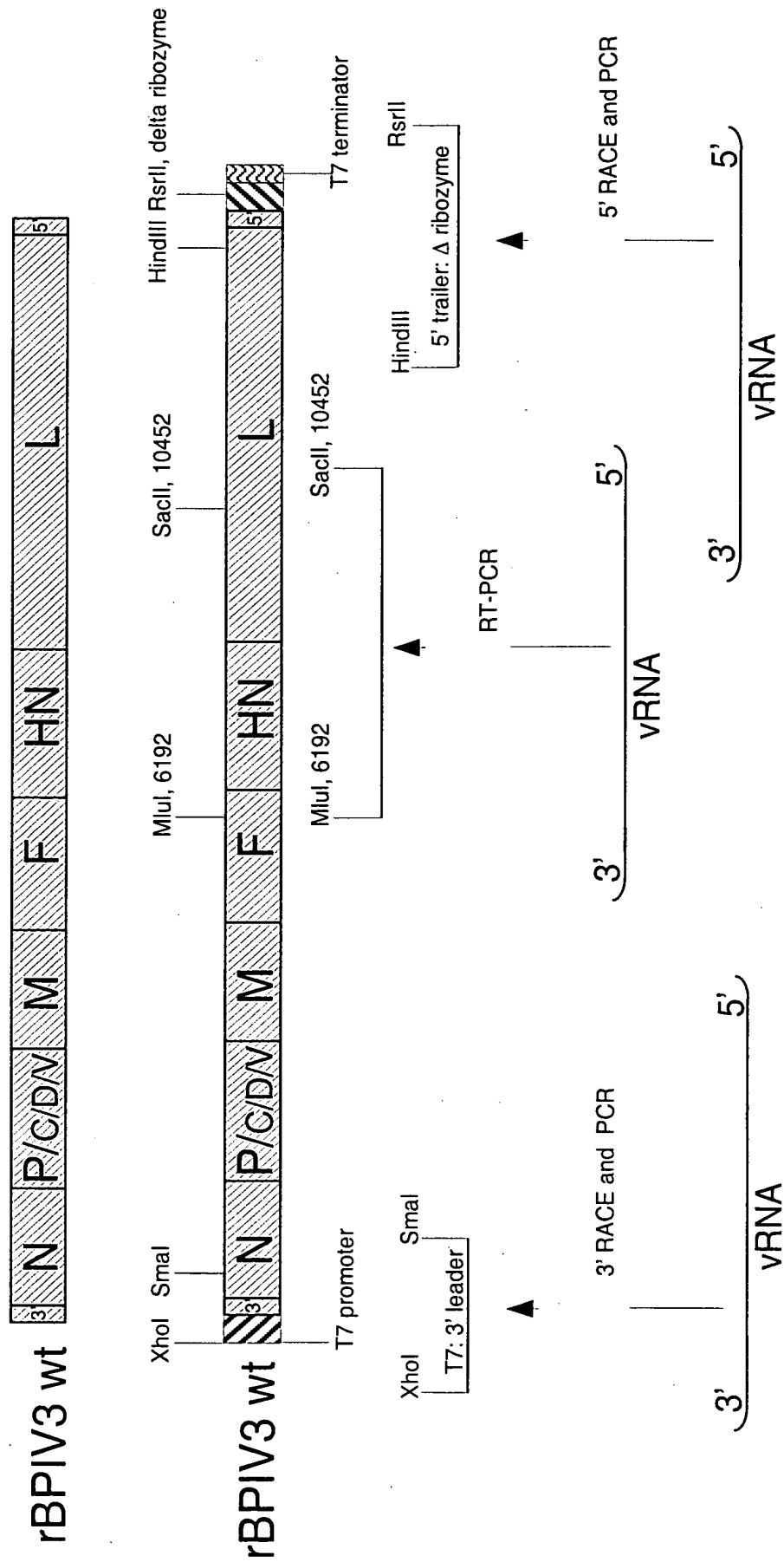
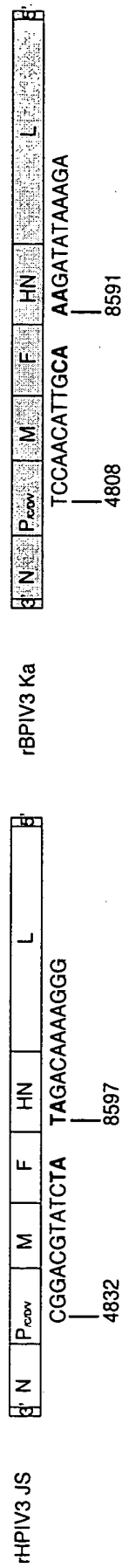


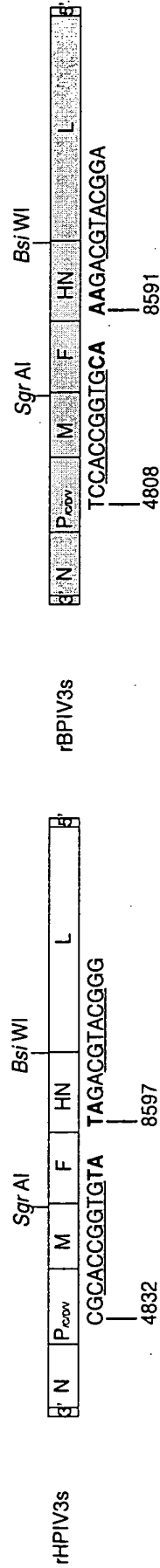
Figure 8C

Generation of full length cDNA clones encoding HPIV3/BPIV3 antigenic chimeric viruses

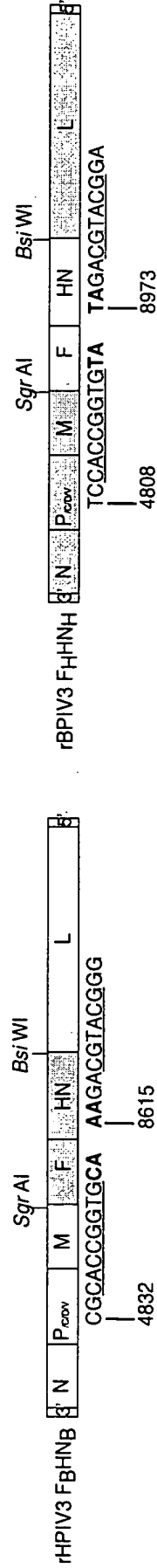
1. Generation of HPIV3 and BPIV3 full length clones



2. Mutagenesis to create unique SgrAI and BsiWI restriction sites



3. Cloning of the F and HN genes into the heterologous full length cDNA



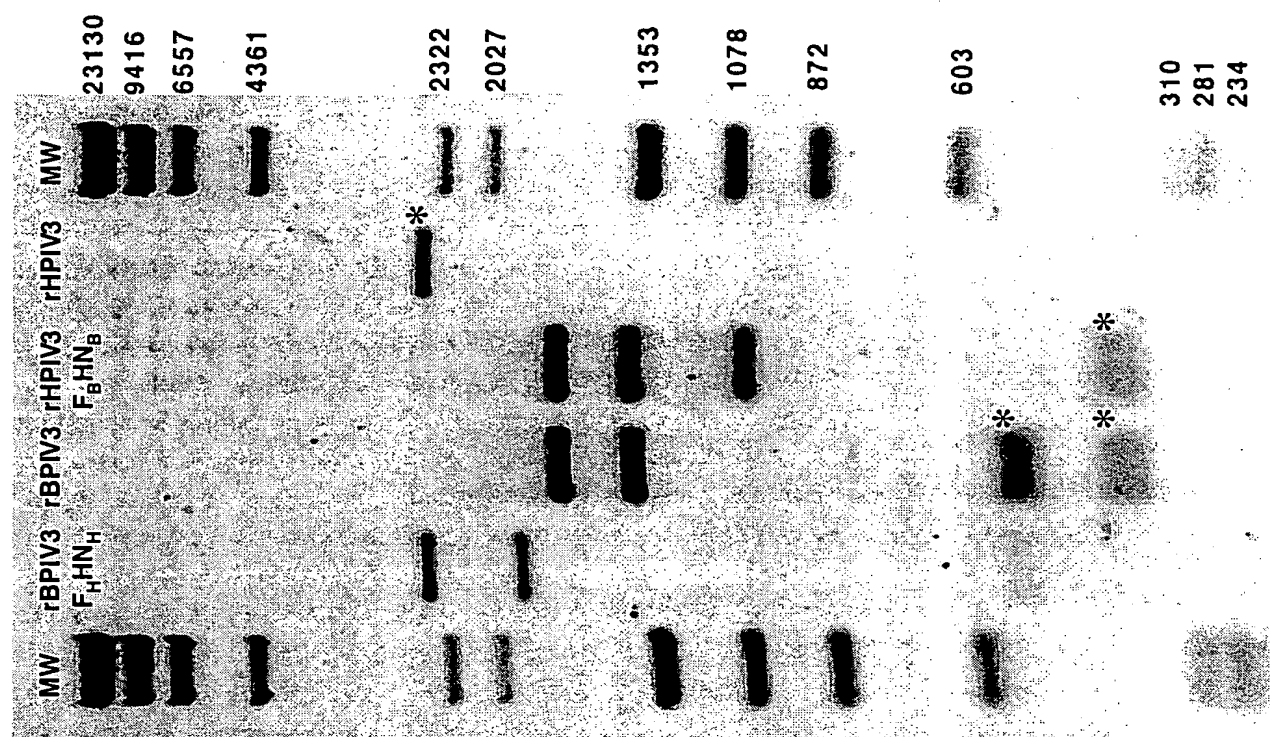
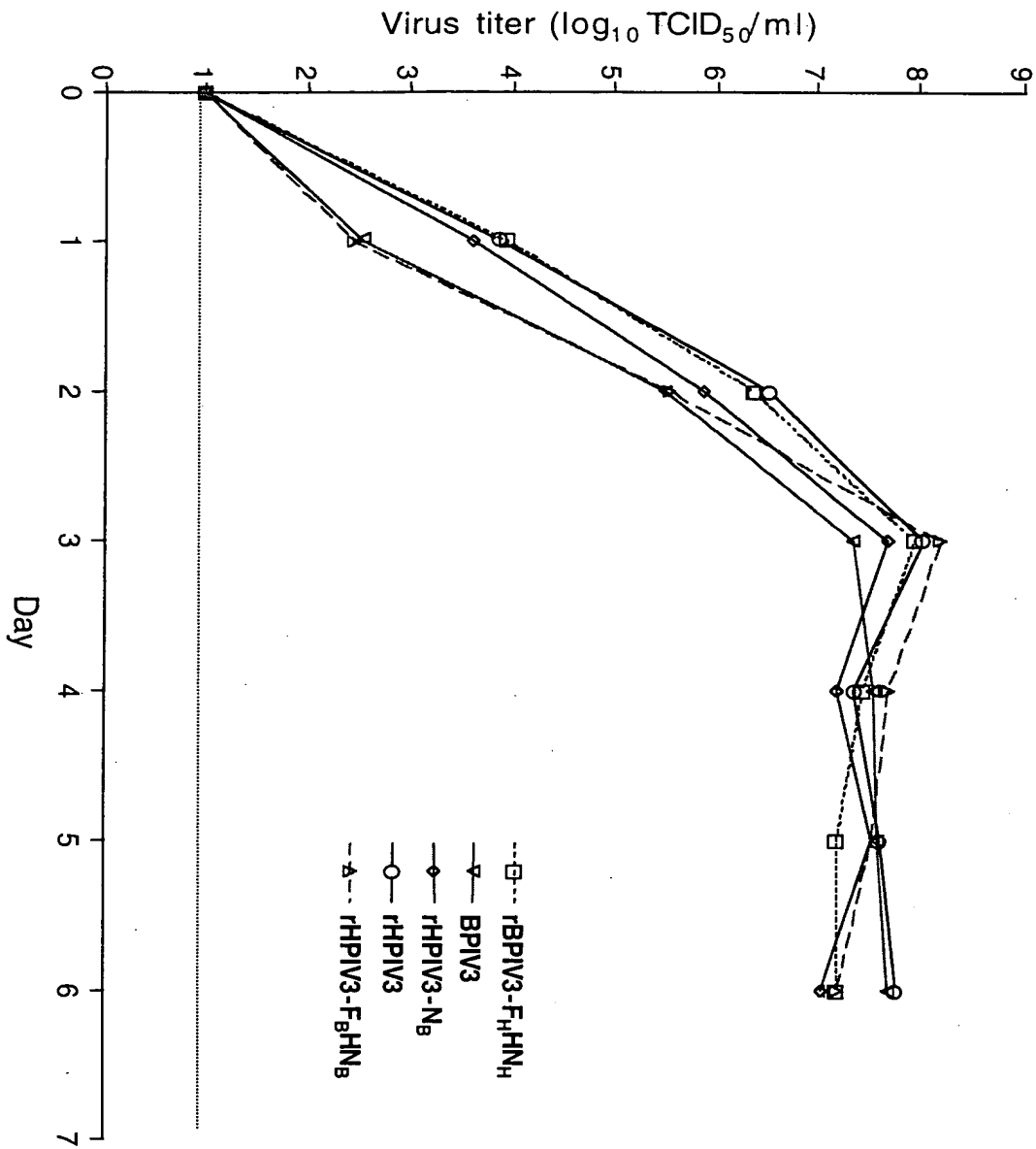
[illegible]

Figure 10



00533470-050400

Figure 11

